Folsom City Council
Staff Report

MEETING DATE:	6/23/2026
AGENDA SECTION:	Public Hearing
ITEM TITLE:	Toll Brothers at Alder Creek - South of Alder Creek Parkway, east and west of Oak Avenue Parkway, north of Mangini Parkway, and east of Prairie City Road, in the Folsom Plan Area (MSTR25-00084) i. Resolution No. 11643 – A Resolution of the City Council Determining that the Toll Brothers at Alder Creek Project is Exempt from CEQA and Approving a Small-Lot Vesting Tentative Subdivision Map, Planned Development Permit, Inclusionary Housing Plan, and Minor Administrative Modification
FROM:	Community Development Department

RECOMMENDATION / CITY COUNCIL ACTION

Staff forwards the following recommendation to the City Council:

Approve Resolution No 11643 - A Resolution of the City Council Determining that the Toll Brothers at Alder Creek project is Exempt from CEQA pursuant to CEQA Guidelines Section 15182 and Approving a Small-Lot Vesting Tentative Subdivision Map, Planned Development Permit, Inclusionary Housing Plan, and Minor Administrative Modification.

The Planning Commission reviewed the proposed project on May 20, 2026, and recommended approval by the City Council with the additional request that the Council consider requiring inclusion of a Class IV bike lane along Oak Avenue Parkway. More information on this request is included in the Analysis section of this report.

BACKGROUND / ISSUE

The proposed project involves several related actions associated with a proposed residential development:

- A **Small Lot Vesting Tentative Subdivision Map** to create 1,424 residential lots in 18 Villages over an area of approximately 464.2 acres. Additional parcels are also included for private recreation, park, landscaping, open space, roadway, fire station, and elementary school use. In total, 1,497 lots will be created.
- A **Planned Development Permit** to establish unique development standards for the project, and to review landscape theming and design and preliminary homesite design guidelines and architectural themes.
- An **Inclusionary Housing Plan** to pay in-lieu fees to meet the project's affordable housing needs.
- A **Minor Administrative Modification** to adjust boundaries between Specific Plan land use designations to accommodate more efficient use of land within the project boundary and adopt an alternative roadway cross section for Alder Creek Parkway.

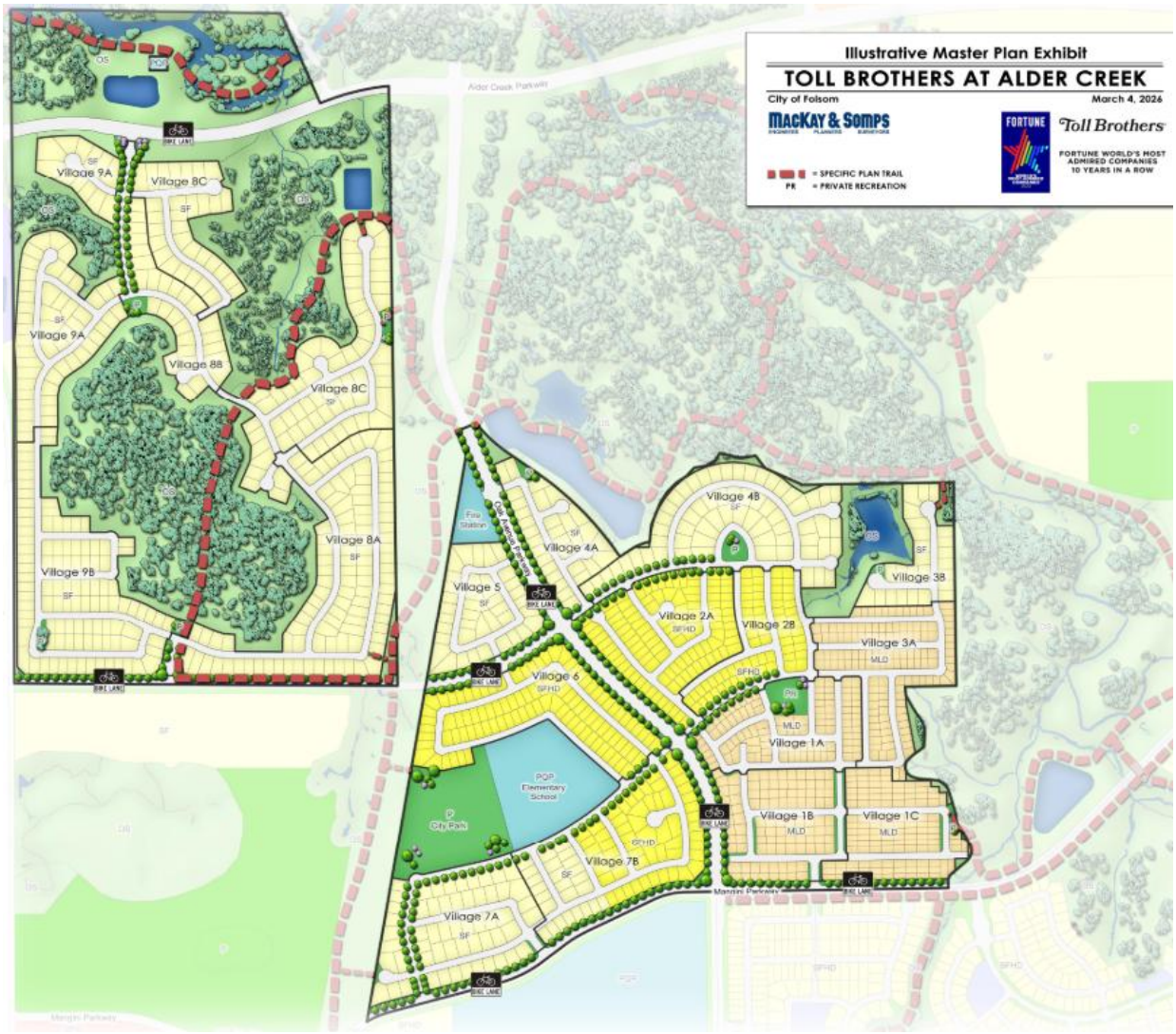
The proposed project is in the western area of the Folsom Plan Area Specific Plan (FPASP or Plan Area). The project area includes FPASP residential land use designations of Single Family (SF), Single Family High Density (SFHD), and Multi-Family Low Density (MLD), and non-residential land use designations of Park (P), Public/Quasi Public (PQP), and Open Space (OS).

The Project is primarily a residential development. However, it includes multiple parcels that are designated for open space, parkland, school, and fire services. Private mini-parks and a private community recreation facility are also proposed. The applicant has created an overall land plan that includes these additional land uses, which is shown in Figure 1 on the following page.

A full description of the project and requested entitlements can be found in the Planning Commission Staff Report (Attachment 2).

The project was continued from the June 9, 2026, City Council agenda to the June 23, 2026, agenda at the request of the applicant.

FIGURE 1: ILLUSTRATIVE MASTER PLAN EXHIBIT



POLICY / RULE

The Folsom Municipal Code (FMC) requires that applications for Tentative Subdivision Maps be forwarded to the City Council for final action. City Council actions regarding Tentative Subdivision Maps are covered under Section 16.16.080 of the FMC.

The project site is in a Planned Development (PD) Overlay District. Pursuant to FMC Chapter 17.38, the PD Overlay District requires development to request a PD Permit. The PD Overlay District allows greater flexibility in the design of integrated developments than possible through strict application of land use regulations and encourages the creative and efficient use of land.

In addition, the City of Folsom Charter Section 7.08(C) (Measure W) requires that the FPASP preserve thirty percent of the Plan Area in perpetual open space.

ANALYSIS

The following sections provide brief summaries of staff's analysis of the project. More in-depth analysis can be found in the Planning Commission Staff Report (Attachment 2).

General Plan and Specific Plan Consistency

The city provides residential lands at a variety of residential densities as specified in the General Plan and in the Folsom Municipal Code. The Folsom Plan Area Specific Plan includes specialized zoning (Specific Plan Land Use Designations) that are customized to the Plan Area as adopted in 2011 and as amended over time. The FPASP provides residential lands at densities ranging from 1-4 dwelling unit per acre (SF), 4-7 dwelling units per acre (SFHD), 7-12 dwelling units per acre (MLD), 12-20 dwelling units per acre (MMD), 20-30 dwelling units per acre (MHD), and 9-30 dwelling units per acre (MU). The Toll Brothers at Alder Creek project is proposed to build out densities consistent with the applicable land use designations. The land uses and densities proposed are consistent with the General Plan and Specific Plan.

Small Lot Vesting Tentative Subdivision Map

As shown in the Preliminary Final Map Phasing Plan (Attachment 14), the applicant plans to file multiple final maps on the tentative map and has included notice of this intent as part of the Project Narrative (Attachment 19). The proposed Small-Lot Vesting Tentative Subdivision Map creates the necessary easements to allow for roads and utilities to facilitate development of the individual parcels, as well as parcels providing shared access, landscaping, and open space that will be owned and maintained by one or more Homeowners Association (HOA). The applicant has provided a proposed street name list as required under FMC Section 16.16.050. The list has been reviewed by safety agencies and refined based on their input and is included as Attachment 17 to this staff report. Condition No. 23 requires that the street names be shown as approved on the final map(s). Staff have determined that the proposed Small Lot Vesting Tentative Subdivision Map, if approved concurrently with the Planned Development Permit request, complies with all City requirements (Folsom Municipal Code [FMC], Title 16), as well as with the requirements of the State Subdivision Map Act (Government Code Sections 66410 *et seq.*).

Backbone Infrastructure

The construction of the backbone infrastructure was envisioned in both the General Plan and the FPASP to occur as part of and in tandem with new development. The applicant and landowners have provided a Conceptual Backbone Infrastructure Phasing Plan for both the Southwest District and the Central District west of East Bidwell Street (refer to Attachment 15). This document identifies all the backbone infrastructure, including roadways and utility infrastructure, to be built out as each of the different parcels develop in the FPASP. City staff reviewed the proposed Conceptual Phasing Plan and found that it provided the necessary information to determine relative timing and responsibility for completion of necessary backbone infrastructure for the Southwest and Central Districts of the Plan Area.

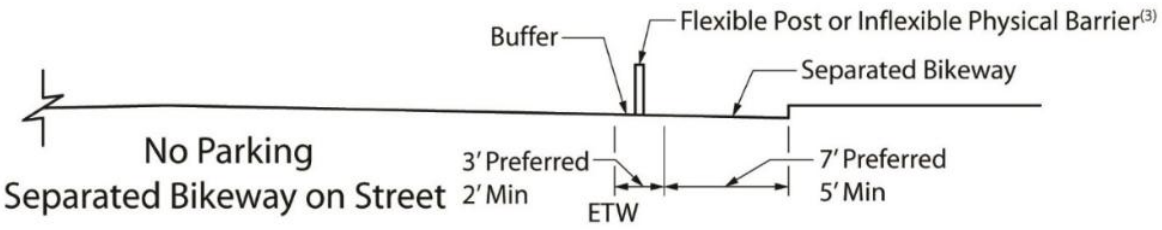
Traffic, Access, and Circulation
The 2011 Folsom Plan Area Specific Plan Environmental Impact Report/Environmental Impact Statement (EIR/EIS) included not only a detailed analysis of traffic-related impacts within the Plan Area, but also an evaluation of traffic-related impacts on the surrounding communities. In total, there are fifty-five (55) traffic-related mitigation measures associated with development of the FPASP. Condition No. 11 requires that the Project comply with all applicable mitigation measures including those related to traffic.

Staff from the Community Development Department, Public Works Department, and Fire Department then worked with the applicant team and property ownership over many months to review options for roadway improvements that would move the backbone system phasing plan forward in a logical and realistic manner but would be responsive to financing and timing constraints facing the applicant during Project buildout. A set of Conditions of Approval were developed that balance the needs of all parties, recommended by city staff, and accepted by the Project applicant. These are Condition Nos. 33 through 39 in Attachment 3. With these conditions and adoption of the FPASP Central and Southwest Districts Conceptual Backbone Infrastructure Phasing Plan (Attachment 15), staff believe that the Project is consistent with General Plan and Plan Area policies related to Traffic, Access, and Circulation.

During the May 20, 2026, Planning Commission meeting, the Commission recommended that the project include Class IV bike lanes along Oak Avenue Parkway, to encourage bicycling to the school and park sites in the central area of the project. A Class IV bike lane (also known as a separated bikeway or protected bike lane) is an on-street bike lane that uses a physical barrier to separate cyclists from moving car traffic as shown below in Figure 2. Based on the Commission's recommendation, the applicant is considering including new Class IV bike lanes on both the east and west sides of Oak Avenue Parkway in lieu of the Class II bike lanes identified in the FPASP.

However, the applicant has requested additional time to evaluate this recommendation before they decide on whether to include this. As a result, staff added an advisory condition (Condition No. 106), that identifies the requirements for Class IV bike lanes if the applicant decides to add these in lieu of the Class II lanes. If the applicant chooses to make this change to the existing cross section for Oak Avenue Parkway as requested by the Commission, Condition No. 107 has been added to require future approval of a staff-level Minor Administrative Modification (MAM) prior to the start of site improvement work since this would be a minor change to the Oak Avenue Parkway cross section in the plan. A MAM is an administrative tool in the FPASP that allows for minor changes to the specific plan so long as they don't impact the future Town Center, worsen access to parks and schools, or create an environmental issue.

FIGURE 2: EXAMPLE OF CLASS IV BIKE LANE



Open Space and Oak Woodland Preservation

Open Space

The Project includes modification of the boundaries between Plan Area land use designations, including the boundaries of the OS (Open Space) designation, requested through a Minor Administrative Modification (MAM). The applicant states that significant work went into design of the land plan for the development to create a lotting pattern and supporting infrastructure plan that is both efficient and sensitive to the OS areas that surround much of the Project site. This resulted in an increase of approximately 5.9 acres of open space to the overall OS total because of this Project. As a result, staff determined that the project remains consistent with the City of Folsom Charter Section 7.08(C) (Measure W) because it maintains and even adds to the 30% open space preservation requirement.

Oak Woodland Preservation

The FPASP EIR/EIS (Mitigation Measure 3A.3-5) requires the applicant to submit an Oak Tree Mitigation Plan consistent with the approved Oak Tree Mitigation and Monitoring Plan for the FPASP to mitigate for impacts to the oak woodland preserve areas and isolated oak trees located on the project site. Conditions have been placed on the Project that require the applicant to submit the Oak Tree Mitigation Plan for the areas of the oak woodland that are affected and obtain tree removal permits for individual oak trees as required. This will keep the project in conformance with the required mitigation measures.

The Specific Plan includes Policy 10.13 which requires that development "preserve and protect in perpetuity approximately 396.52-acres of existing oak woodlands." Staff requested that the applicant provide an analysis that demonstrated whether their project would reduce the amount of oak woodland below the 396.52-acre threshold identified in the specific plan. The applicant was able to demonstrate that their project would not reduce the oak woodland below the threshold. In fact, there would be approximately 425.52 acres of oak woodland that would remain. However, staff note that these calculations do not include potential woodland impacts from future development. The applicant provided an exhibit showing how they determined their potential impact to oak woodland and the balance of woodland expected to remain after completion of their project (Attachment 23).

After the Toll project, since only 29.14 more acres of oak woodland can be removed by future development before hitting the minimum woodland area threshold, it is expected that future projects may either need to reduce their size to avoid additional oak woodland loss or prepare a specific plan amendment and associated environmental review and obtain Council approval. As a result, other residential and non-residential projects in the Plan Area are expected to deal with this major constraint.

Trails, Parks, Fire Station, and School Sites

The Project is adjacent to multiple Open Space parcels that are expected to include Class I bikeways and trails as well as connection points for pedestrian and bicycle access at various

locations. In addition, the Project includes sites that will be transferred to the City for a Neighborhood Park and a Fire Station. Finally, the Project includes a property adjacent to the Neighborhood Park site that will be transferred to the Folsom Cordova Unified School District (FCUSD) to develop as a future elementary school site referred to by the school district as Granite Springs Elementary School. All these expected uses are consistent with the Plan Area Land Use Plan. The project is conditioned to provide all required roadway and other development improvements and pay applicable impact fees to support them.

Planned Development Permit

The Project is requesting a Planned Development (PD) Permit in compliance with the existing PD Overlay Zoning, per FPASP Sections 13.2 (*Approvals and Entitlements*) and A.2.3 (*Overlay Combining Zones*). The PD Permit includes consideration of development standard deviations and project level architectural and landscape design guidelines. These include smaller lot sizes in the SFHD and MLD zones and new development standards to accommodate their 4-pack and 6-pack housing product types. Staff have reviewed the proposed development standard deviations and architectural and landscape design guidelines and believe that they comply with the intent and purpose of the FPASP and meet the review criteria under FMC Section 17.38.100.

Inclusionary Housing Plan

The FPASP and Section 17.104 of the FMC require all for-sale residential development projects consisting of 10 or more units satisfy the city's inclusionary housing requirement. One option for satisfying the requirement is to pay a fee to the city in lieu of constructing the required number of inclusionary units for the development project. Consistent with the requirements of Section 17.104.060(F)(5) of the FMC, the applicant has submitted a signed letter stating that their intent is to pay the in-lieu fee for this project (Attachment 18). Additionally, Condition No. 32 requires payment of the applicable in-lieu fee, as required by FMC Section 17.104.060(F)(5). Staff have reviewed the intent letter and believe it, in combination with Condition No. 32, complies with the requirements of FMC Section 17.104 in that it confirms the applicant will satisfy the Inclusionary Housing Ordinance by paying fees.

Minor Administrative Modification

The applicant also proposed a Minor Administrative Modification (MAM) to increase the number of FPASP Parcels (utilized to track residential unit allocations within the Plan Area) by dividing some larger parcels and modify Specific Plan Land Use boundaries to reflect more detailed land planning around open space resources and the public park and school site. In addition, City staff and the applicant agreed to amend the roadway cross section for Alder Creek Parkway and include it as part of the MAM. Staff reviewed the proposed MAM against the criteria set forth in Section 13 of the FPASP and concluded that the proposed change meets all that are applicable. A more detailed analysis of the proposed MAM and the related evaluation criteria is included in the Planning Commission staff report in Attachment 2.

FINANCIAL IMPACT

No financial impact is anticipated with the approval of the Small-Lot Vesting Tentative Subdivision Map, Planned Development Permit, or Design Review as the project will not result in any changes to the total number of residential units within the FPASP.

ENVIRONMENTAL REVIEW

Pursuant to CEQA Guidelines Section 15182(c), where a public agency has prepared an EIR on a specific plan after January 1, 1980, a residential project undertaken pursuant to and in conformity to that specific plan is exempt from CEQA if the project meets the requirements of this section. Residential projects covered by this section include but are not limited to land subdivisions, zoning changes, and residential planned unit developments.

The City of Folsom as Lead Agency, had a Conformity Analysis prepared by ECORP Consulting, Inc. to identify and assess compliance of the Alder Creek Subdivision Tentative Map Project (Proposed Project) with the program-level Folsom Plan Area Specific Plan (FPASP) Environmental Impact Report/Environmental Impact Statement (EIR/EIS, State Clearinghouse [SCH]# 2008092051). This Conformity Analysis also satisfied CEQA (Public Resources Code [PRC], Section 21000 et seq.) and state CEQA Guidelines (Title 14, California Code of Regulations [CCR] 15000 et seq.). The Conformity Analysis is included with this report along with supporting Appendices as Attachment 20.

The Conformity Analysis found that an Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Folsom South of U.S. Highway 50 Specific Plan Project was prepared jointly by the City of Folsom and U.S. Army Corps of Engineers (USACE) to fulfill requirements of the California Environmental Quality Act (CEQA) and National Environmental Policy Act, respectively. A Notice of Determination (NOD) for the EIR was filed by the City of Folsom on June 15, 2011 (State Clearinghouse [SCH] #2008092051), and a Record of Decision for the EIR/EIS was filed by the USACE on August 12, 2011, (SPK-2007-02159). A Mitigation Monitoring and Reporting Program (MMRP) was prepared and adopted with the FPASP and is a binding document applicable to the Alder Creek Property development (Appendix A, Mitigation Monitoring and Reporting Program). The approved MMRP outlines mitigation measures required for all projects located within the FPASP. In addition, an Initial Study (IS) and Mitigated Negative Declaration (MND) was prepared for the FPASP Backbone Infrastructure (BB IS/MND), and an NOD was filed by the City of Folsom on February 25, 2015 (SCH# 2114122018). The BB IS/MND outlines mitigation measures specifically for Backbone Infrastructure development. The mitigation measures in the BB IS/MND mirror the original EIR/EIS with some modifications.

On June 8, 2026, the law firm of Lozeau Drury, LLP submitted a comment letter on the project on behalf of Laborers International Union of North America, Local Union 185 (LIUNA Letter). The LIUNA Letter argued that new information regarding special status species in the project area and new mitigation measures available related to greenhouse gas emissions and indoor air quality

protection required that the city prepare a Supplemental EIR for adequate CEQA review. The LIUNA Letter is included with this report as Attachment 25.

On June 15, 2026, the law firm of Buchalter, on behalf of the project applicant, submitted a response to the LIUNA Letter that included a memo from ECORP Consulting, Inc., who completed the project's Consistency Analysis (Buchalter Letter). The Buchalter Letter refuted the assertions of the LIUNA Letter that new information or changed circumstances are in play in this circumstance and argued that the Conformity Analysis remains adequate and compete. The ECORP memo analyzed the special status species listed in the LIUNA Letter and found that none met the criteria for consideration after a review of species habitats, sightings, and listing status. ECORP also stated that multiple recent surveys by their staff on the project site resulted in no sightings of the species listed. The ECORP memo also rejected the new mitigation measures put forth by the LIUNA Letter as lacking evidence of efficacy in reducing greenhouse gas emissions or improving indoor air quality. The Buchalter Letter is included with this report as Attachment 26.

Staff has reviewed the LIUNA Letter and Buchalter Letter and remains confident that the proposed project implements and is consistent with the Folsom Plan Area Specific Plan and its supporting Environmental Impact Report/Environmental Impact Statement (EIR/EIS), and none of the factors set forth in CEQA Guidelines Section 15162 (Subsequent EIRs and Negative Declarations) are present or have been identified, pursuant to CEQA Guidelines Section 15182 (Projects Pursuant to a Specific Plan). Therefore, the city finds that the project is exempt from further CEQA compliance. The city further finds that the project is also exempt pursuant to Government Code Section 65457 related to specific plans.

ATTACHMENTS

1. Resolution No. 11643
    a. Exhibit A – Small Lot Vesting Tentative Subdivision Map, dated May 29, 2026
    b. Exhibit B – Conditions of Approval
2. Planning Commission Staff Report without Attachments, dated May 20, 2026,
3. Conditions of Approval (Refer to Exhibit B of Resolution No. 11643)
4. Vicinity Map
5. Small Lot Vesting Tentative Subdivision Map, dated May 29, 2026 (Refer to Exhibit A of Resolution No. 11643)
6. Preliminary Grading & Storm Drain Plan, dated May 13, 2026
7. Preliminary Sanitary Sewer, Recycled Water & Domestic Water Plan, dated May 13, 2026
8. Illustrative Master Plan Exhibit, dated March 4, 2026

9. Perimeter Wall and Fence Exhibit, dated November 6, 2025
10. Toll Brothers at Alder Creek Architectural Design Guidelines
11. Toll Brothers at Alder Creek Landscape Design Guidelines
12. Retaining Walls Exhibit, dated March 2026
13. Solid Waste Management Cart Location Exhibit, dated June 2025
14. Toll Brothers at Alder Creek Final Map Preliminary Phasing Exhibit, dated May 6, 2026
15. Folsom Plan Area Conceptual Backbone Infrastructure Phasing Plan, dated May 2026
16. Minor Administrative Modification Exhibits, dated April 7, 2025
17. Street Name List, Final, dated March 17, 2026
18. Inclusionary Housing Plan Letter, dated April 15, 2026
19. Project Narrative, dated April 2026
20. Alder Creek Conformity Analysis with Appendices, date November 19, 2025
21. Kimley Horne Traffic Report and Circulation Study, dated April 1, 2025
22. Arborist Report, dated April 2025
23. Folsom Plan Area Oak Woodlands Exhibit, dated June 12, 2026
24. Resident Comment Letter, dated April 21, 2026
25. Lozeau Drury Comment Letter, dated June 8, 2026
26. Buchalter/ECORP Comment Response Letter, dated June 15, 2026

Submitted,

PAM JOHNS
Community Development Director

Attachment 1

Resolution No. 11643

RESOLUTION NO. 11643

A RESOLUTION OF THE CITY COUNCIL DETERMINING THAT THE TOLL BROTHERS AT ALDER CREEK PROJECT IS EXEMPT FROM CEQA PURSUANT TO CEQA GUIDELINES SECTION 15182 AND APPROVING A SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION

WHEREAS, the Planning Commission on May 20, 2026, held a public hearing on the proposed Small-Lot Vesting Tentative Subdivision Map, Inclusionary Housing Plan, and Minor Administrative Modification to the Folsom Plan Area Specific Plan, considered public comment and, based on the proposed configuration of the 1,424 single-family residential lots, determined the proposed subdivision complies with all City requirements, as well as with the requirements of the State Subdivision Map Act; and

WHEREAS, the Planning Commission recommends that the City Council approve the proposed small lot vesting tentative subdivision map, planning development permit, inclusionary housing plan, and minor administrative modification for the Toll Brothers at Alder Creek; and

WHEREAS, notice has been given at the time and in the manner required by State Law and City Code; and

WHEREAS, the proposed Toll Brothers at Alder Creek is exempt from further environmental review under Section 15182 (Projects Implementing Specific Plans) of the CEQA Guidelines.

NOW, THEREFORE, BE IT RESOLVED by the Folsom City Council that the Small-Lot Vesting Tentative Subdivision Map, Planned Development Permit, Inclusionary Housing Plan, and Minor Administrative Modification for the Toll Brothers at Alder Creek Project creating 1,424 single-family residential parcels, as shown in Exhibit "A", are hereby approved.

BE IT FURTHER RESOLVED that these approvals are subject to the conditions of approval attached as Exhibit "B" based on the following findings:

GENERAL FINDINGS

A. NOTICE OF HEARING HAS BEEN GIVEN AT THE TIME AND IN THE MANNER REQUIRED BY STATE LAW AND CITY CODE.

B. THE PROJECT IS CONSISTENT WITH THE GENERAL PLAN AND THE FOLSOM PLAN AREA SPECIFIC PLAN, WITH APPROVAL OF THE REQUESTED MINOR ADMINISTRATIVE MODIFICATION.

CEQA FINDINGS

C. THE CITY, AS LEAD AGENCY, PREVIOUSLY CERTIFIED AN ENVIRONMENTAL IMPACT REPORT/ENVIRONMENTAL IMPACT STATEMENT FOR THE FOLSOM PLAN AREA SPECIFIC PLAN.

D. THE CITY HAS DETERMINED THAT THE TOLL BROTHERS AT ALDER CREEK PROJECT IS UNDERTAKEN TO IMPLEMENT AND IS CONSISTENT WITH THE FOLSOM PLAN AREA SPECIFIC PLAN.

E. THE CITY HAS DETERMINED THAT THE IMPACTS OF THE TOLL BROTHERS AT ALDER CREEK PROJECT ARE ADEQUATELY ADDRESSED BY THE FINAL ENVIRONMENTAL IMPACT REPORT FOR THE FOLSOM PLAN AREA SPECIFIC PLAN AND ASSOCIATED MITIGATION MEASURES AND THAT THE TOLL BROTHERS AT ALDER CREEK PROJECT IS EXEMPT FROM THE REQUIREMENTS OF CEQA PURSUANT TO GOVERNMENT CODE SECTION 65457 AND CEQA GUIDELINES 15182(C).

F. NONE OF THE EVENTS SPECIFIED IN SECTION 21166 OF THE PUBLIC RESOURCES CODE OR SECTION 15162 OF THE CEQA GUIDELINES HAVE OCCURRED.

G. THIS PROJECT IS EXEMPT FROM CEQA IN ACCORDANCE WITH GOVERNMENT CODE SECTION 65457 AND SECTION 15182 OF THE CEQA GUIDELINES.

TENTATIVE SUBDIVISION MAP FINDINGS

H. THE PROPOSED SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP IS CONSISTENT WITH THE CITY'S SUBDIVISION ORDINANCE AND THE SUBDIVISION MAP ACT IN THAT THE PROJECT IS SUBJECT TO CONDITIONS OF APPROVAL THAT WILL ENSURE THAT THE PROJECT IS DEVELOPED IN COMPLIANCE WITH CITY STANDARDS.

I. THE PROPOSED SUBDIVISION, TOGETHER WITH THE PROVISIONS FOR ITS DESIGN AND IMPROVEMENT, IS CONSISTENT WITH THE GENERAL PLAN (AS AMENDED), THE FOLSOM PLAN AREA SPECIFIC PLAN (AS AMENDED), AND ALL APPLICABLE PROVISIONS OF THE FOLSOM MUNICIPAL CODE.

J. THE SITE IS PHYSICALLY SUITABLE FOR THE TYPE OF DEVELOPMENT PROPOSED.

K. THE SITE IS PHYSICALLY SUITABLE FOR THE PROPOSED DENSITY OF DEVELOPMENT.

L. AS CONDITIONED, THE DESIGN OF THE SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP AND THE PROPOSED IMPROVEMENTS ARE NOT LIKELY

TO CAUSE SUBSTANTIAL ENVIRONMENTAL DAMAGE OR SUBSTANTIALLY AND AVOIDABLY INJURY FISH OR WILDLIFE OR THEIR HABITAT.

M. AS CONDITIONED, THE DESIGN OF THE SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP AND THE PROPOSED IMPROVEMENTS ARE NOT LIKELY TO CAUSE SERIOUS PUBLIC HEALTH OR SAFETY PROBLEMS.

N. THE DESIGN OF THE SMALL-LOT TENTATIVE SUBDIVISION MAP AND THE TYPE OF IMPROVEMENTS WILL NOT CONFLICT WITH EASEMENTS FOR ACCESS THROUGH OR USE OF PROPERTY WITHIN THE PROPOSED SUBDIVISION.

O. SUBJECT TO SECTION 66474.4 OF THE SUBDIVISION MAP ACT, THE LAND IS NOT SUBJECT TO A CONTRACT ENTERED INTO PURSUANT TO THE CALIFORNIA LAND CONSERVATION ACT OF 1965 (COMMENCING WITH SECTION 51200 OF THE GOVERNMENT CODE).

PLANNED DEVELOPMENT PERMIT FINDINGS

P. THE PROPOSED PROJECT COMPLIES WITH THE INTENT AND PURPOSES OF CHAPTER 17.38 (PLANNED DEVELOPMENT DISTRICT) OF THE FOLSOM MUNICIPAL CODE AND OTHER APPLICABLE ORDINANCES OF THE CITY.

Q. THE PROPOSED PROJECT IS CONSISTENT WITH THE OBJECTIVES, POLICIES AND REQUIREMENTS OF THE DEVELOPMENT STANDARDS OF THE CITY.

R. THE MINOR MODIFICATIONS TO EXISTING DEVELOPMENT STANDARDS PROPOSED BY THIS PROJECT WILL RESULT IN A DEVELOPMENT THAT IS SUPERIOR TO THAT OBTAINED BY RIGID APPLICATION OF THE STANDARDS.

S. THE PROPOSED PROJECT IS DESIGNED TO PROVIDE OPEN SPACE, CIRCULATION, OFF-STREET PARKING, AND OTHER CONDITIONS IN SUCH A WAY AS TO FORM A HARMONIOUS, INTEGRATED PROJECT OF SUFFICIENT QUALITY TO JUSTIFY EXCEPTIONS TO THE NORMAL REGULATIONS

T. WITH RESPECT TO PROJECT DESIGN, THE PHYSICAL, FUNCTIONAL, AND VISUAL COMPATIBILITY BETWEEN THE PROPOSED PROJECT AND EXISTING AND FUTURE ADJACENT USES AND AREA CHARACTERISTICS IS ACCEPTABLE.

U. THERE WILL BE AVAILABLE PUBLIC FACILITIES, INCLUDING BUT NOT LIMITED TO WATER, SEWER AND DRAINAGE TO ALLOW FOR THE DEVELOPMENT OF THE PROJECT SITE IN A MANNER CONSISTENT WITH THE PROPOSAL AS CONDITIONED.

V. THE PROPOSED PROJECT WILL NOT CAUSE ADVERSE ENVIRONMENTAL

IMPACTS WHICH HAVE NOT BEEN MITIGATED TO AN ACCEPTABLE LEVEL.

W. THE PROPOSED PROJECT WILL NOT CAUSE UNACCEPTABLE VEHICULAR TRAFFIC LEVELS ON SURROUNDING ROADWAYS AND THE PROPOSED PROJECT WILL PROVIDE ADEQUATE INTERNAL TRAFFIC CIRCULATION, INCLUDING INGRESS AND EGRESS.

X. THE PROPOSED PROJECT WILL NOT BE DETRIMENTAL TO THE HEALTH, SAFETY, AND GENERAL WELFARE OF THE PERSONS OR PROPERTY WITHIN THE VICINITY OF THE PROJECT SITE AND THE CITY AS A WHOLE, ADEQUATE PROVISION IS MADE FOR THE FURNISHING OF SANITATION SERVICE AND EMERGENCY PUBLIC SAFETY SERVICES TO THE PROJECT.

Y. THE PROJECT IS CONSISTENT WITH THE FOLSOM PLAN AREA SPECIFIC PLAN AND FOLSOM PLAN AREA EIR/EIS. ACCORDINGLY THE PROPOSED PROJECT'S WATER DEMAND CAN BE ACCOMMODATED BY THE CITY'S EXISTING WATER SUPPLY ALLOCATED TO SERVE THE FOLSOM PLAN AREA.

INCLUSIONARY HOUSING PLAN FINDINGS

Z. THE APPLICANT HAS SATISFIED THE REQUIREMENTS OF FMC SECTION 17.104.060(F) RELATED TO THE PROVISION OF AN INCLUSIONARY HOUSING PLAN.

MINOR ADMINISTRATIVE MODIFICATION FINDINGS

AA. THE APPLICANT HAS SATISFIED THE CRITERIA FOR APPROVAL OF A MINOR ADMINISTRATIVE MODIFICATION UNDER FPASP SECTION 13.3 (ADMINISTRATIVE PROCEDURES):

1. THE PROPOSED MODIFICATION IS WITHIN THE PLAN AREA.
2. THE MODIFICATION DOES NOT REDUCE THE SIZE OF THE PROPOSED TOWN CENTER.
3. THE MODIFICATION RETAINS COMPLIANCE WITH CITY CHARTER ARTICLE 7.08, PREVIOUSLY KNOWN AS MEASURE W.
4. THE GENERAL LAND USE PATTERN REMAINS CONSISTENT WITH THE INTENT AND SPIRIT OF THE FPASP
5. THE PROPOSED CHANGES DO NOT SUBSTANTIALLY ALTER THE BACKBONE INFRASTRUCTURE NETWORK.
6. THE PROPOSED MODIFICATION OFFERS EQUAL OR SUPERIOR IMPROVEMENTS TO DEVELOPMENT CAPACITY OR STANDARDS.
7. THE PROPOSED MODIFICATION DOES NOT INCREASE ENVIRONMENTAL IMPACTS BEYOND THOSE IDENTIFIED IN THE EIR/EIS.

8. RELOCATED PARK OR SCHOOL PARCELS CONTINUE TO MEET THE STANDARDS FOR THE TYPE OF PARK OR SCHOOL PROPOSED.

9. RELOCATED PARK OR SCHOOL PARCELS REMAIN WITHIN WALKING DISTANCE OF THE RESIDENTS THEY SERVE.

PASSED AND ADOPTED this 23rd day of June, 2026, by the following roll-call vote:

AYES: Councilmember(s):
NOES: Councilmember(s):
ABSENT: Councilmember(s):
ABSTAIN: Councilmember(s):

_____
Justin Raithel, MAYOR

ATTEST:

_____
Christa Freemantle, CITY CLERK

Exhibit A

Small Lot Vesting Tentative Subdivision Map, dated May 13, 2026

82' RIGHT-OF-WAY
4 LANE COLLECTOR
ALDER CREEK PARKWAY
N.T.S.

56' RIGHT-OF-WAY
2-LANE COLLECTOR
MANGINI PARKWAY
N.T.S.

78' RIGHT-OF-WAY
MINOR ARTERIAL
OAK AVENUE PARKWAY
N.T.S.

78' RIGHT-OF-WAY
PRAIRIE CITY ROAD
SOUTH OF ALDER CREEK PARKWAY
N.T.S.

LAND USE SUMMARY

Lot / Village #	FPASP Designation	Land Use / Lot Size	Acres Gross	Acres Net	Dwelling Units	Net Density
9A	MLD	Single-Family Residential / 62' x 110' Duets	12.8	11.3	104	9.2
9B	MLD	Single-Family Residential / 4-Packs	12.8	12.3	101	8.2
7C	MLD	Single-Family Residential / 4-Packs	11.6	11.3	124	11.0
2A	SFHD	Single-Family Residential / 47' x 95'	15.2	15.0	106	7.1
2B	SFHD	Single-Family Residential / 47' x 75'	10.2	10.2	71	7.0
3A	MLD	Single-Family Residential / 45' x 65'	14.2	14.1	132	9.4
3B	SF	Single-Family Residential / 70' x 110'	6.5	6.4	25	3.9
4A	SF	Single-Family Residential / 65' x 105'	8.5	8.1	31	3.8
4B	SF	Single-Family Residential / 70' x 110'	19.0	17.0	63	3.7
5	SF	Single-Family Residential / 65' x 105'	9.9	9.9	38	3.9
6	SFHD	Single-Family Residential / 52' x 100'	16.5	16.6	99	5.6
7A	SF	Single-Family Residential / 70' x 110'	19.0	16.7	56	3.0
7B*	SFHD/SF	Single-Family Residential / 60'x100' & 75'x110'	19.0	19.0	83	4.3
8A*	SF	Single-Family Residential / 65'x105'	24.9	24.4	104	4.3
8B	SF	Single-Family Residential / 70' x 110'	10.2	9.1	27	3.0
8C	SF	Single-Family Residential / 75' x 110'	29.5	28.8	96	3.3
9A	SF	Single-Family Residential / 70' x 110'	19.7	17.7	62	3.5
9B	SF	Single-Family Residential / 60' x 105'	21.5	21.0	102	4.9
A	P	Park	10.0	10.0	-	-
B	PQP	Elementary School	10.0	10.0	-	-
C	PQP	Fire Station	2.1	2.1	-	-
D	MLD	Private Park	-	1.4	-	-
E	SF	Mini-Park	-	0.6	-	-
F	MLD	Mini-Park	-	0.2	-	-
G	MLD	Mini-Park	-	0.2	-	-
H	SF	Mini-Park	-	0.3	-	-
I	SF	Native Park	-	0.2	-	-
J	SF	Mini-Park	-	0.3	-	-
K	SF	Mini-Park	-	0.4	-	-
L	SF	Mini-Park	-	0.4	-	-
M	OS	Open Space	7.5	7.5	-	-
N	OS	Open Space	0.7	0.7	-	-
O	OS	Open Space	30.2	30.2	-	-
P	OS	Open Space	8.0	8.0	-	-
Q	OS	Open Space	34.2	34.2	-	-
R	OS	Open Space	51.4	51.4	-	-
S	OS	Open Space	0.8	0.8	-	-
T	OS	Open Space	0.4	0.4	-	-
Open Space** (OS-1 thru OS-5)	acres	Open Space (Residential Villages)	1.6	1.6		
Landscape Corridor** (LC-1 thru LC-5)	acres	Landscape (Major Roadway)	13.8	13.8		
Landscape** (LC-1 thru LC-23)	acres	Landscape (Residential Villages)	-	2.0		
Major Roadway***	acres	Roadway Areas	10.1	10.1		
Total			**464.3**	**464.2**	**1434 TOTAL DU**	

* Village 7B has 7-79 at 90'x90' and 76-83 at 60'x100' units, Village 8A has 1-20 at 65'x105', 21-79 at 70'x110' units
** See Open Space Summary table (this sheet) and Landscape Corridor Summary table (Sheet 3)
*** Alder Creek Parkway, Mangini Parkway, Oak Avenue Parkway and Street D

OPEN SPACE SUMMARY

VILLAGE OPEN SPACE	ACRE	FPASP DESIGNATION
OS-1	0.00	Open Space
OS-2	0.04	Open Space
OS-3	0.49	Open Space
OS-4	0.25	Open Space
OS-5	0.82	Open Space
OS-6	0.15	Open Space
VILLAGE OPEN SPACE	1.6	

OPEN SPACE	ACRE	FPASP DESIGNATION
A	7.5	Open Space
N	0.7	Open Space
O	30.2	Open Space
P	8.0	Open Space
Q	34.2	Open Space
R	51.4	Open Space
S	0.8	Open Space
T	0.4	Open Space
OPEN SPACE	133.0	
TOTAL OPEN SPACE	134.6	

TENTATIVE MAP INFORMATION

APPLICANT:	TOLL WEST COAST, LLC 110 Woodmere Road, Suite 120 Folsom, CA 95630
OWNER:	ALDER CREEK WEST IMPROVEMENT COMPANY, LLC 4370 Town Center Blvd, Suite 100 El Dorado Hills, CA 95762
ENGINEER:	MACKAY & SOMPS CIVIL ENGINEERS, INC. 1005 Creekside Ridge Drive, Suite 150 Roseville, CA 95678 916-773-1389
ASSESSOR'S PARCEL NUMBERS:	072-0060-007, 072-0060-093 & 072-3190-037 and portions of 072-0060-098 & 072-0060-102
SITE AREA:	464.2 ± AC.
EXISTING ZONING:	A portion of the Folsom Plan Area Specific Plan
NUMBER OF LOTS/PARCELS:	1,497 TOTAL LOTS 411: Single Family (SF) lots 352: Single Family High Density (SFHD) lots 132: Multi-Family Low Density (MLD) lots 104: Multi-Family Low Density (MLD) Duet lots 101: Multi-Family Low Density (MLD) 4-Pack lots 124: Multi-Family Low Density (MLD) 6-Pack lots NEW TOTAL RESIDENTIAL LOTS 1: Fire Station (PF/QP) lot 1: Elementary School (PF/QP) lot 1: Private Park (MLD) Lot 3: Park (P) Lot 7: Mini Park (P) lots 1: Native Park (P) lot 14: Open Space (OS) lots 22: Open Space/ Landscape Corridor (OS/LC) Lots 25: Landscape (LC) Lots
SERVICE PROVIDERS:	
SCHOOL DISTRICTS:	Folsom Cordova Unified School District
PARKS & RECREATION:	City of Folsom
FIRE & EMERGENCY SERVICES:	City of Folsom
LAW ENFORCEMENT:	City of Folsom
SANITARY SEWER:	City of Folsom
DOMESTIC WATER:	City of Folsom
STORM DRAIN:	City of Folsom
ELECTRIC SERVICES:	SMUD
NATURAL GAS:	PG&E
TELEPHONE:	AT&T
CABLE:	Comcast

TENTATIVE MAP NOTES

PROPERTY DESCRIPTION: A portion of Parcels 4 & 5 as shown on 224 PM 14, Sacramento County Records & lots 6, 7, 8, & 10 as shown on 452 BM 2, Sacramento County Records.

1. Lot dimensions and acreages are approximate and subject to change.
2. Typical lot size is measured from back of sidewalk. On irregular shaped lots, lot size is measured at setback(s).
3. Lot lines and lot areas may be adjusted at the time of the Final Map(s) provided no additional lots are created, subject to the approval of the City of Folsom. Flexibility in lot configuration as shown hereon is allowed provided the new configuration is in substantial compliance with the approved Specific Plan, subject to the approval of the City of Folsom.
4. The Final Mapping and subsequent development of lots may be phased. Phasing is to be consistent with the Development Agreement.
5. Lot numbering is for identification purposes only and does not indicate phasing order of development. Ultimate development phasing shall be orderly and will be determined at Final Map and/or improvement plan stage.
6. Pursuant to Government Code Section 66456.1, the subdivider may file multiple Final Maps based upon this Tentative Map. The filing of a Final Map on a portion of this Tentative Map shall not invalidate any part of this Tentative Map.
7. Pursuant to California Government Code Section 66499.20.2, the land shown hereon may be merged and resubdivided without reversion to acreage and may constitute abandonment of portions of the existing public streets and public easements, subject to the approval of the City of Folsom.
   a. All on-site public easements & IOD's to be abandoned, as described on the Existing Easements Exhibit, Sheet 2 of 11.
8. Street names shown hereon are for identification purposes only. A street name list will be approved with the Tentative Map; final streets names & locations will be determined at the time of Final Map and Improvement Plan preparation.
9. Additional easements to accommodate new public utility improvements, access required for lot development, or other similar mapping requirements needed to accomplish the final design may be added prior to each Final Map based on this Tentative Map.
10. A 12.5' public utility easement will be located adjacent to all rights-of-way except as shown hereon and approved by the City Engineer.
11. Landscape lots are also PUE, PAE & LE.
12. The entire property contained within this Tentative Subdivision Map is covered by an Avigation Easement to the benefit of the City of Folsom and County of Sacramento recorded August 28, 2014 in Book 20140828 at page 0578, Official Records of Sacramento County.

BENCHMARK

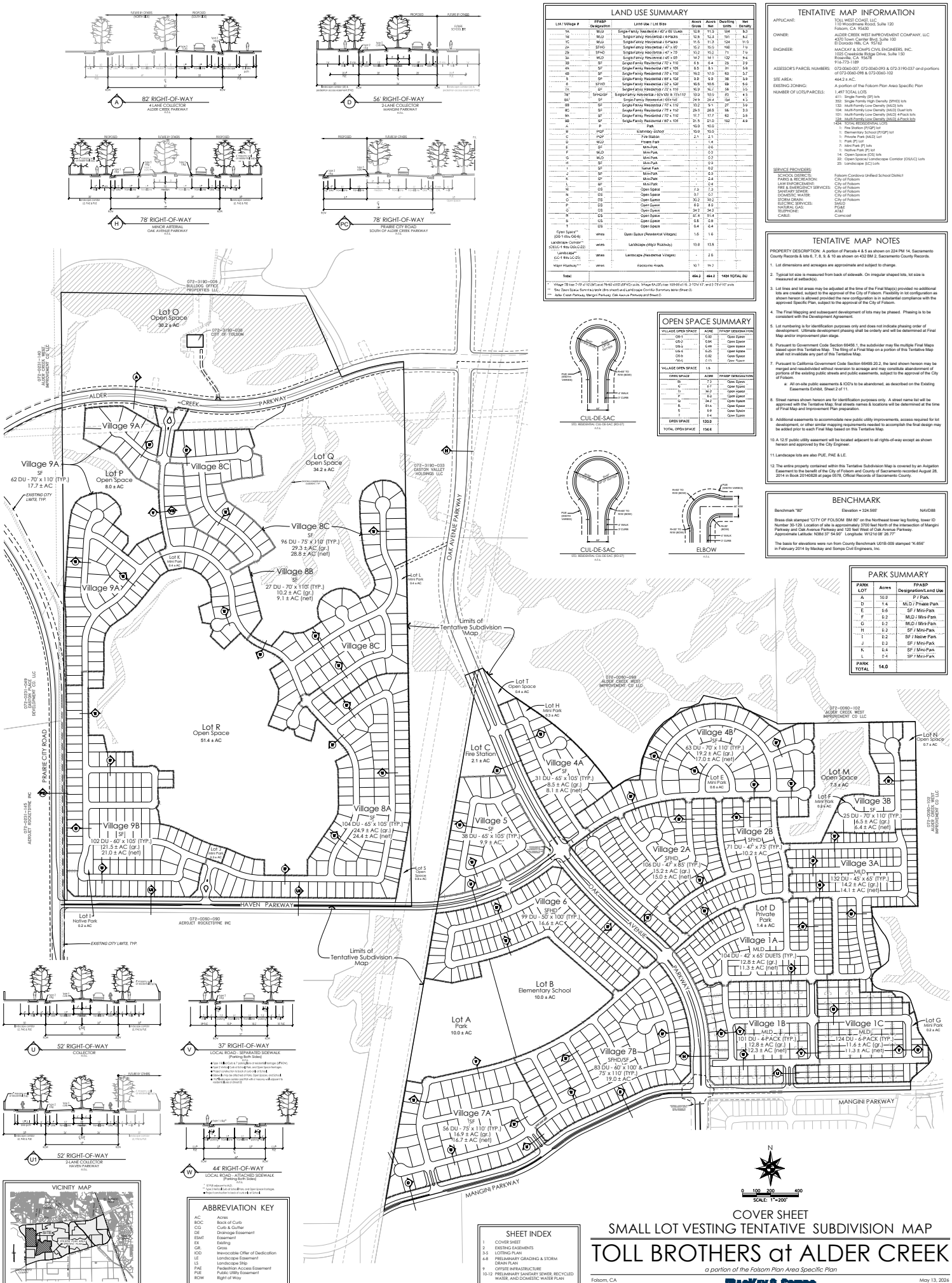
Benchmark "80" — Elevation = 324.565' — NAVD88

Brass disk stamped "CITY OF FOLSOM BM 80" on the Northeast tower leg footing, tower ID Number 30-129. Location of site is approximately 3700 feet North of the intersection of Mangini Parkway and Oak Avenue Parkway and 120 feet West of Oak Avenue Parkway.
Approximate Latitude: N38d 37' 54.90" Longitude: W121d 09' 28.77"

The basis for elevations were run from Control Benchmark U01B-009 stamped "K-856" in February 2014 by Mackay and Somps Civil Engineers, Inc.

PARK SUMMARY

PARK LOT	Acres	FPASP Designation/Land Use
A	10.0	P / Park
D	1.4	MLD / Private Park
E	0.6	SF / Mini-Park
F	0.2	MLD / Mini-Park
G	0.2	MLD / Mini-Park
H	0.3	SF / Mini-Park
I	0.2	SF / Native Park
J	0.3	SF / Mini-Park
K	0.4	SF / Mini-Park
L	0.4	SF / Mini-Park
PARK TOTAL	14.0	



52' RIGHT-OF-WAY
COLLECTOR
N.T.S.

37' RIGHT-OF-WAY
LOCAL ROAD - SEPARATED SIDEWALK
(Parking Both Sides)
N.T.S.

- Lots 1-6 & Lots 8-7 parking bays restricted frontage (4 MOW)
- Lots 1 behind curb entries & Lots and Open Space frontage
- Transit connection to back of curb on Street L
- Street A may be deleted at times. Open Space, and about
- 10 ft landscape center cell (Trk with 4' reserve) adjacent to residential (see on Sheet 3)

52' RIGHT-OF-WAY
2-LANE COLLECTOR
HAVEN PARKWAY
N.T.S.

44' RIGHT-OF-WAY
LOCAL ROAD - ATTACHED SIDEWALK
(Parking Both Sides)
N.T.S.

- 10 ft landscape lot
- Transit connection to back of curb at Street L
- Open Space and lot frontage

ABBREVIATION KEY

AC	Acres
BOC	Back of Curb
CG	Curb & Gutter
DE	Drainage Easement
ESMT	Easement
EX	Existing
GR	Gross
IOD	Irrevocable Offer of Dedication
LE	Landscape Easement
LS	Landscape Strip
PAE	Pedestrian Access Easement
PUE	Public Utility Easement
ROW	Right of Way

SHEET INDEX

1	COVER SHEET
2	EXISTING EASEMENTS
3-5	LOTTING PLAN
6-8	PRELIMINARY GRADING & STORM DRAIN PLAN
9	OFFSITE INFRASTRUCTURE
10-12	PRELIMINARY SANITARY SEWER, RECYCLED WATER, AND DOMESTIC WATER PLAN

COVER SHEET
SMALL LOT VESTING TENTATIVE SUBDIVISION MAP

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

MacKAY & SOMPS CIVIL ENGINEERING PLANNING SURVEYING

May 13, 2024
REVISED: May 28, 2024

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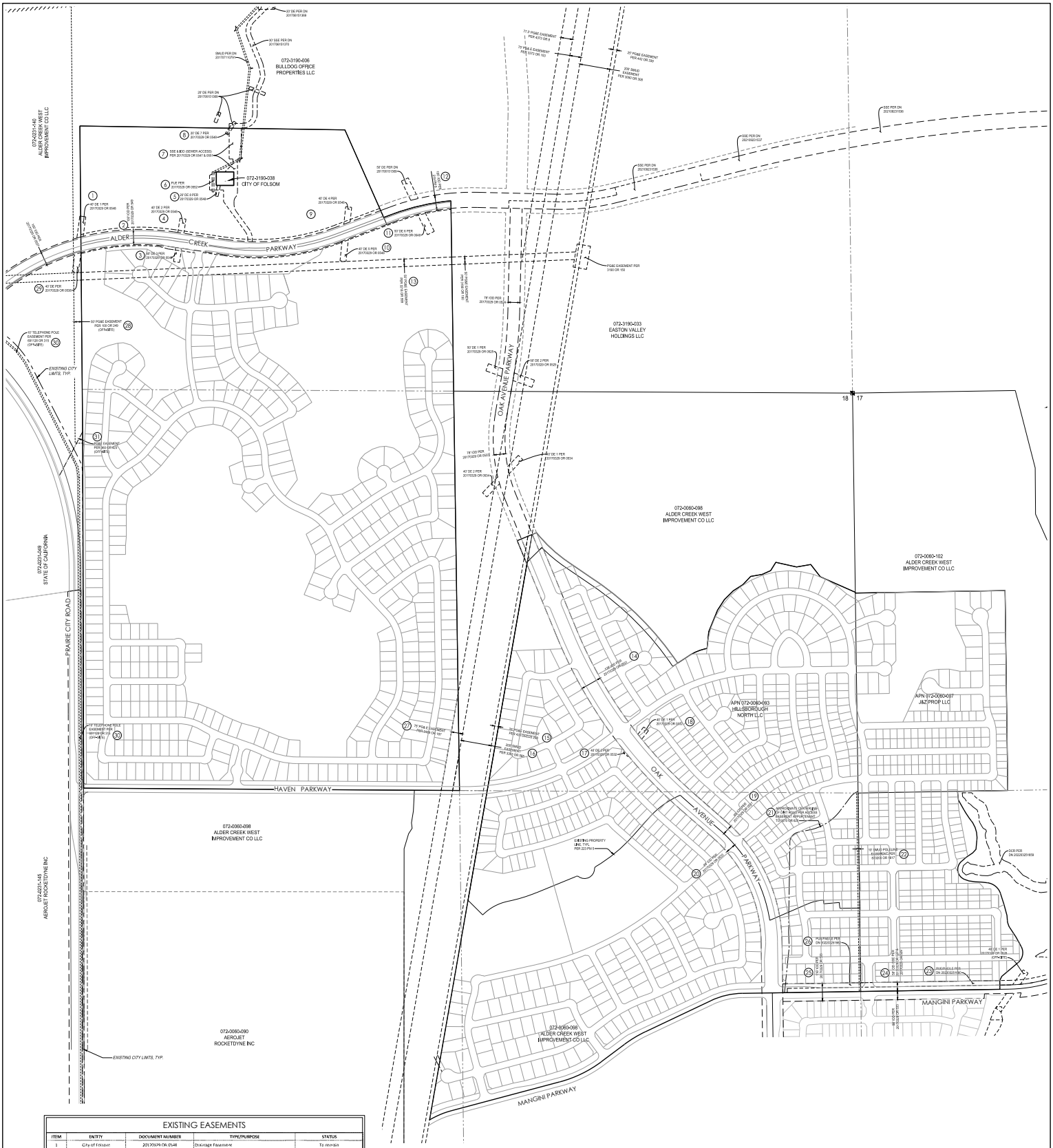


EXISTING EASEMENTS

ITEM	ENTITY	DOCUMENT NUMBER	TYPE/PURPOSE	STATUS
1	City of Folsom	20170329 OR 0548	Drainage Easement	To remain
2	City of Folsom	20170329 OR 549	Irrevocable Offer of Dedication	To remain
3	City of Folsom	20170329 OR 0548	Drainage Easement	To remain
4	City of Folsom	20170329 OR 0548	Drainage Easement	To remain
5	City of Folsom	20170329 OR 0548	Drainage Easement	To remain
6	City of Folsom	20170329 OR 0542	Public Utility Easement	To remain
7	City of Folsom	20170329 OR 0547 & 0551	Sanitary Sewer Easement and IOD (Sewer Access)	To remain
8	City of Folsom	20170329 OR 0548	Drainage Easement	To remain
9	City of Folsom	20170329 OR 0548	Drainage Easement	To remain
10	City of Folsom	20170329 OR 0548	Drainage Easement	To remain
11	City of Folsom	20170329 OR 0548	Drainage Easement	To remain
12	City of Folsom	239 PM 9	Irrevocable Offer of Dedication	To be abandoned (portion) (1)
13	PG&E	5758 OR 584	Transmission Line Easement	To be abandoned & relocated (1)
14	City of Folsom	20170329 OR 0531	Irrevocable Offer of Dedication	To be abandoned
15	PG&E	435 DEEDS 298	Transmission Line Easement	To remain
16	SMUD	4383 OR 584	Transmission Line Easement	To remain
17	City of Folsom	20170329 OR 0532	Drainage Easement (DE 2)	To be abandoned
18	City of Folsom	20170329 OR 0532	Drainage Easement (DE 1)	To be abandoned
19	City of Folsom	20170329 OR 0521	Irrevocable Offer of Dedication	To be abandoned
20	City of Folsom	20170329 OR 0539	Irrevocable Offer of Dedication	To be abandoned
21	Sayer	3090 OR 538	Access Easement	To be quitclaimed
22	SMUD	870206 OR 1017	Pipeline Easement	To be quitclaimed
23	City of Folsom	20200325 OR 1660	PUE/PAE/LE	To be abandoned
24	City of Folsom	20170329 OR 527 & 529	Irrevocable Offer of Dedication	To be abandoned
25	City of Folsom	20170329 OR 533	Irrevocable Offer of Dedication	To be abandoned (portion) (1)
26	City of Folsom	20170525 OR 1662	PUE/PAE/LE	To be abandoned
27	PG&E	3459 OR 187	Transmission Line Easement	To remain
28	PG&E	100 OR 369	Pipeline Easement	To remain
29	City of Folsom	20170329 OR 0538	Drainage Easement	To remain
30	AT&T	691126 OR 334	Pipeline Easement	To be abandoned & relocated (1)
31	PG&E	360 OR 423	Pipeline Easement	To be abandoned & relocated (1)

NOTE: (1) Extents of portions to be abandoned to be determined at time of Final Map.

N

0 100 200 400

SCALE: 1"=200'

EXISTING EASEMENTS
SMALL LOT VESTING TENTATIVE SUBDIVISION MAP

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

MacKAY & SOMPS CIVIL ENGINEERING PLANNING SURVEYING

May 13, 2024

LANDSCAPE SUMMARY		
RESIDENTIAL	ACRE	FPASP DESIGNATION
LC-1	0.00	SP
LC-2	0.05	SP
LC-3	0.05	SP
LC-4	0.04	SP
LC-5	0.04	SP
LC-6	0.14	MLD
LC-7	0.01	MLD
LC-8	0.03	MDR
LC-9	0.07	MDR
LC-10	0.07	MDR
LC-11	0.08	MDR
LC-12	0.07	MDR
LC-13	0.07	MDR
LC-14	0.05	MDR
LC-15	0.05	MDR
LC-16	0.08	MDR
LC-17	0.07	MDR
LC-18	0.23	SP
LC-19	0.21	SP
LC-20	0.05	SP
LC-21	0.11	SP
LC-22	0.36	SP
LC-23	0.39	SP
LC-24	0.00	SP
LC-25	0.32	SP
RESIDENTIAL LC TOTAL	2.6	
BACKBONE	ACRE	FPASP DESIGNATION
OSLC-1	0.29	OS/LC
OSLC-2	0.67	OS/LC
OSLC-3	0.66	OS/LC
OSLC-4	0.70	OS/LC
OSLC-5	0.69	OS/LC
OSLC-6	0.26	OS/LC
OSLC-7	0.26	OS/LC
OSLC-8	0.21	OS/LC
OSLC-9	0.29	OS/LC
OSLC-10A	0.33	OS/LC
OSLC-10B	0.27	OS/LC
OSLC-11	0.29	OS/LC
OSLC-12	0.29	OS/LC
OSLC-13	0.62	OS/LC
OSLC-14	0.69	OS/LC
OSLC-15	0.70	OS/LC
OSLC-16	0.31	OS/LC
OSLC-17	0.87	OS/LC
OSLC-18	0.69	OS/LC
OSLC-19	0.91	OS/LC
OSLC-20	0.84	OS/LC
OSLC-21	0.74	OS/LC
OSLC-22	1.97	OS/LC
BACKBONE OSLC TOTAL	15.8	
TOTAL LANDSCAPE	18.4	

LOTTING PLAN

SMALL LOT VESTING TENTATIVE SUBDIVISION MAP

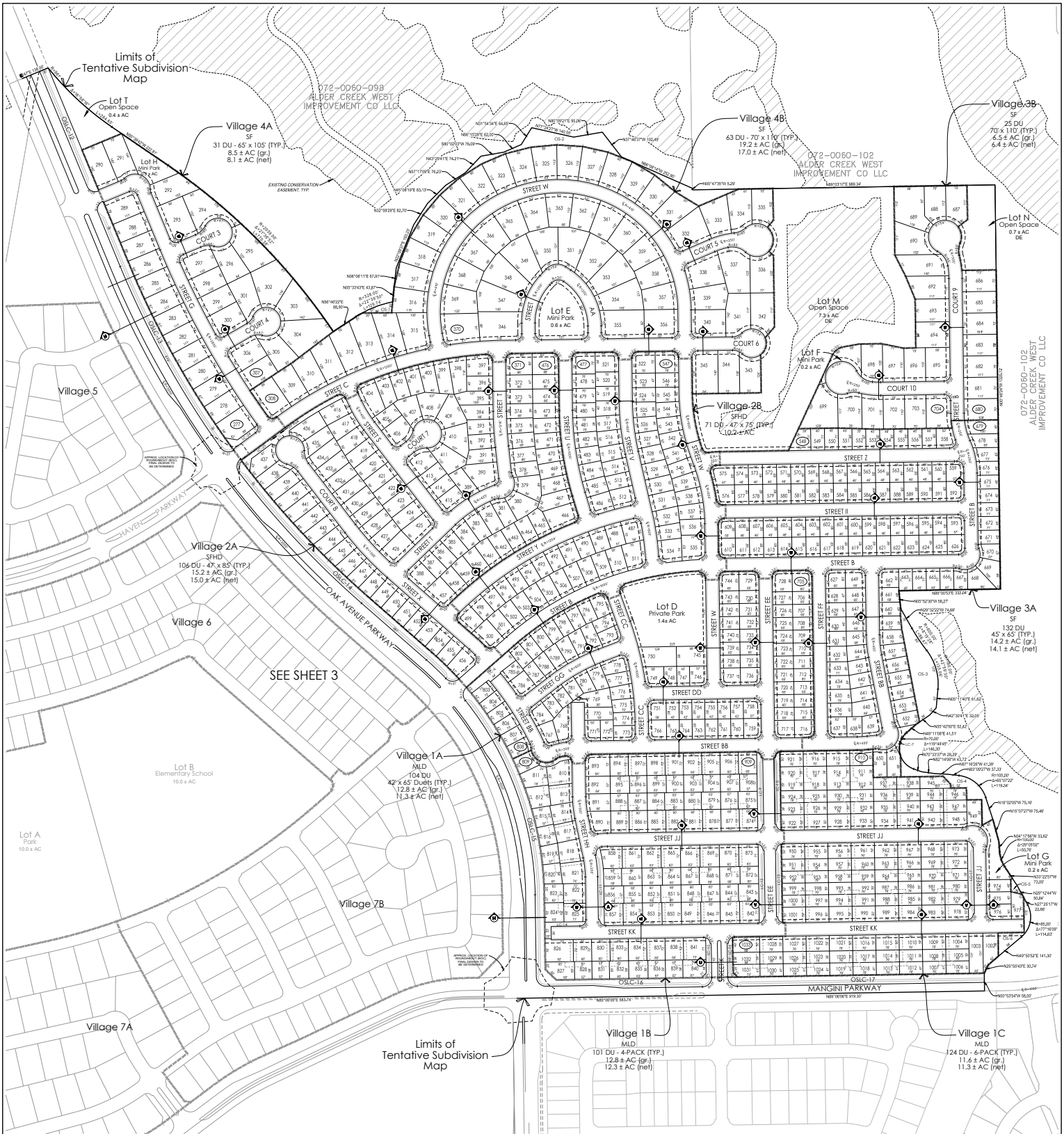
TOLL BROTHERS at ALDER CREEK

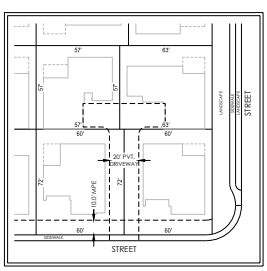
a portion of the Folsom Plan Area Specific Plan

Folsom, CA

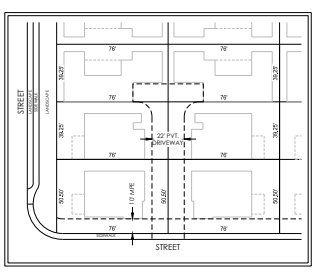
MacKay & Somps

May 13, 2026





4-PACK
TYPICAL LOT DIAGRAM
1"=30'
NOTE: Building footprints are conceptual and subject to revision.



6-PACK
TYPICAL LOT DIAGRAM
1"=30'
NOTE: Building footprints are conceptual and subject to revision.

N

0 50 100 200
SCALE: 1" = 100'

LOTTING PLAN
SMALL LOT VESTING TENTATIVE SUBDIVISION MAP

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

MacKay & Somps

May 13, 2026

Sheet 4 of 12

LOTTING PLAN
SMALL LOT VESTING TENTATIVE SUBDIVISION MAP

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA — May 13, 2026

MacKAY & SOMPS

072-3190-006
BULLDOG OFFICE PROPERTIES - LLC

Limits of Tentative Subdivision Map

Lot O
Open Space
30.2 ± AC
DE

072-3190-038
CITY OF FOLSOM

072-0231-140
ALDER CREEK WEST IMPROVEMENT CO. LLC

ALDER CREEK PARKWAY

OSLC-21

OSLC-22

Village 9A
SF
62 DU
70' x 110' (TYP.)
17.7 ± AC

SEE SHEET 9

Lot P
Open Space
8.0 ± AC
DE

Lot Q
Open Space
34.2 ± AC
DE

072-3190-033
EASTON VALLEY HOLDINGS, LLC

EXISTING CONSERVATION EASEMENT, TYP.

Village 8C
SF
96 DU - 75' x 110' (TYP.)
29.3 ± AC (gr.)
28.8 ± AC (net)

OAK AVENUE PARKWAY

Lot K
Mini Park
0.4 ± AC

Village 8B
SF
27 DU - 70' x 115' (TYP.)
10.2 ± AC (gr.)
9.1 ± AC (net)

Lot L
Mini Park
0.4 ± AC

EXISTING CITY LIMITS, TYP.

072-0231-049
EASTON PLACE DEVELOPMENT CO. LLC

PRAIRIE CITY ROAD

OSLC-20

Village 9B
SF
102 DU - 60' x 105' (TYP.)
21.5 ± AC (gr.)
21.0 ± AC (net)

Lot R
Open Space
51.4 ± AC
DE

Lot C
Fire Station
2.1 ± AC

SEE SHEET 3

Village 8A
SF
104 DU - 65' x 105'
24.9 ± AC (gr.)
24.4 ± AC (net)

072-0231-145
AEROJET ROCKETDYNE INC

Lot J
Mini Park
0.3 ± AC

Lot I
Mini Park
0.3 ± AC

Lot S
Open Space
0.8 ± AC

Limits of Tentative Subdivision Map

OSLC-18

OSLC-19

HAVEN PARKWAY

SEE SHEET 9

EXISTING CITY LIMITS, TYP.

072-0060-090
AEROJET ROCKETDYNE INC

N

SCALE: 1" = 100'

Sheet 5 of 12

PRELIMINARY GRADING & STORM DRAIN PLAN

SMALL LOT VESTING TENTATIVE SUBDIVISION MAP

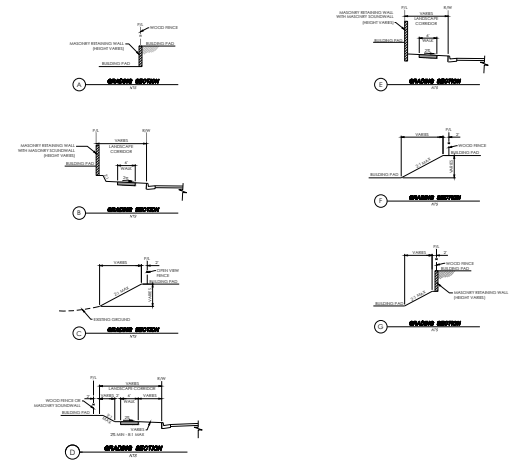
TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

MacKAY & SOMPS

May 13, 2026



LEGEND

PROPOSED	DESCRIPTION	EXISTING
	CANYON DRAIN	4" CYN
12"SD	STORM DRAIN LINE (SIZE INDICATED)	12"SD
	STORM DRAIN MANHOLE	
	JUNCTION BOX	
	DROP INLET	
	INLET/OUTLET	
	SLOPE	
0.4%	STREET GRADE	0.4%
100.00	CENTERLINE ELEVATION	100.00

N

0 50 100 200

SCALE: 1"=100'

PRELIMINARY GRADING & STORM DRAIN PLAN

VESTING TENTATIVE SUBDIVISION MAP

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

MacKAY & SOMPS

May 13, 2026

PRELIMINARY GRADING & STORM DRAIN PLAN

SMALL LOT VESTING TENTATIVE SUBDIVISION MAP

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

May 13, 2026

MacKAY & SOMPS

LEGEND

PROPOSED	DESCRIPTION	EXISTING
	CANYON DRAIN	
18"SD	STORM DRAIN LINE (SIZE INDICATED)	18"SD
	STORM DRAIN MANHOLE	
	JUNCTION BOX	
	DROP INLET	
	INLET/OUTLET	
	SLOPE	
0.4%	STREET GRADE	0.4%
103.03	CENTERLINE ELEVATION	103.03

SEE SHEET 9

SEE SHEET 9

SEE SHEET 6

Lot O
Open Space
39.2 ± AC
DE

Lot P
Open Space
8.0 ± AC
DE

Lot Q
Open Space
34.2 ± AC
DE

Lot R
Open Space
51.4 ± AC
DE

Lot K
Park Site
4.4 ± AC

Lot L
Park Site
2.4 ± AC

Lot S
Park Site
2.0 ± AC

HYDRO MODIFICATION BASIN No. 3

HYDRO MODIFICATION BASIN No. 11

COMBINATION BASIN No. 1

EXISTING CONSERVATION EASEMENT, TYP

EXISTING CITY LIMITS, TYP

ENVIRONMENTAL IMPACT LIMITS, TYP

072-3190-006
BULLDOG OFFICE PROPERTIES LLC

072-0231-140
ALDER CREEK IMPROVEMENT CO

072-0231-164
EASTON PLACE

072-0231-165
EASTON PLACE

072-0231-166
EASTON PLACE

072-0231-167
EASTON PLACE

072-0231-168
EASTON PLACE

072-0231-169
EASTON PLACE

072-0231-145
AEROJET ROCKETDYNE INC

072-0060-090
AEROJET ROCKETDYNE INC

OSLC-22

OSLC-18

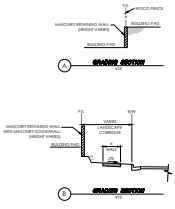
OSLC-19

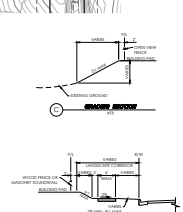
STREET NN

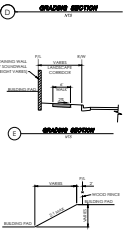
STREET OO

STREET LL

PARKWAY

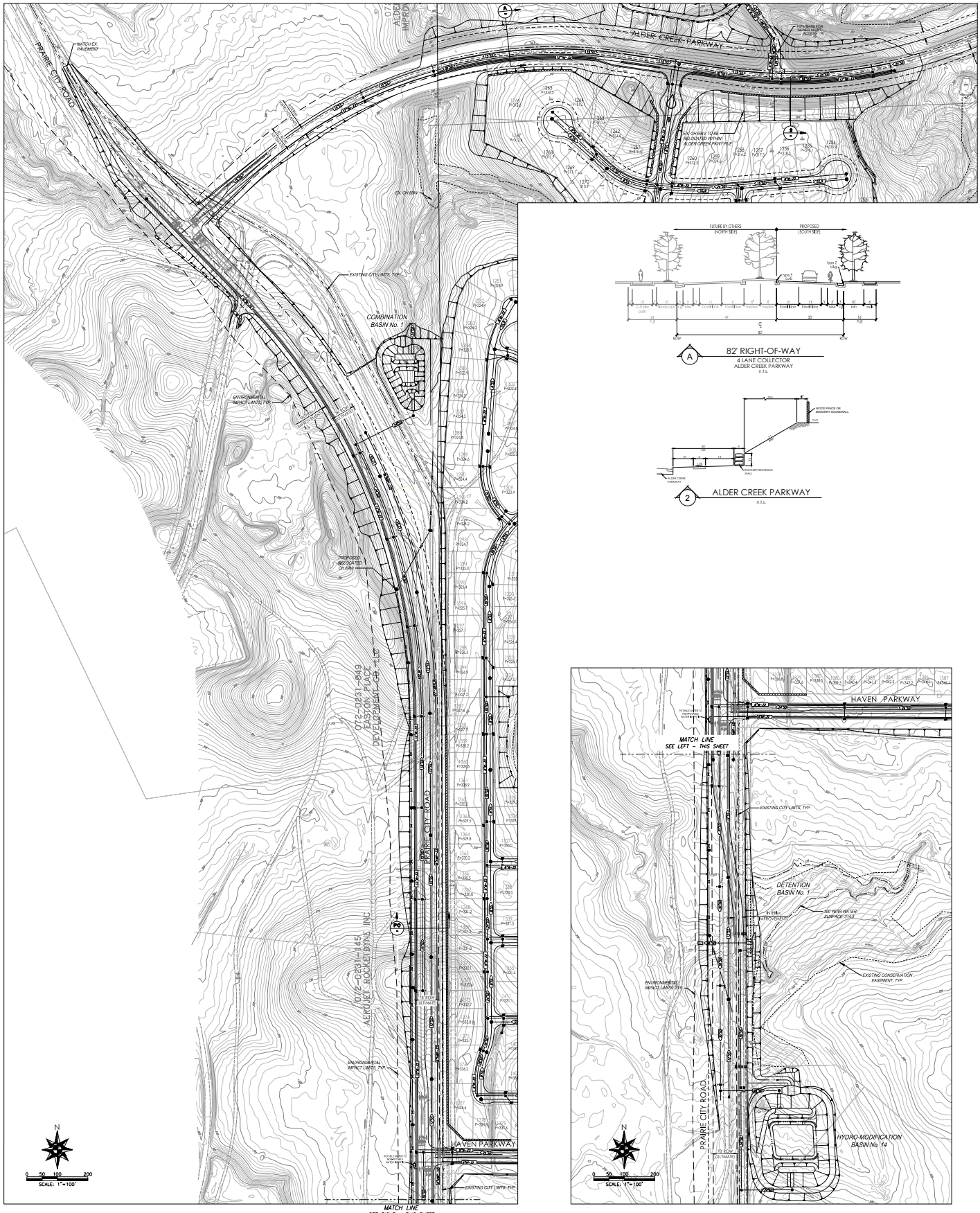






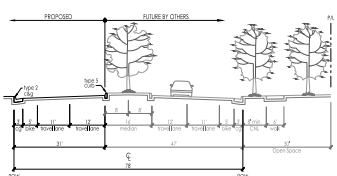
0 50 100 200

SCALE: 1"=100'



A 82' RIGHT-OF-WAY
4 LANE COLLECTOR
ALDER CREEK PARKWAY
n.t.s.

2 ALDER CREEK PARKWAY
n.t.s.



PC 78' RIGHT-OF-WAY
PRAIRIE CITY ROAD
SOUTH OF ALDER CREEK PARKWAY
n.t.s.

OFFSITE INFRASTRUCTURE - PRAIRIE CITY ROAD,
COMBINATION BASIN No. 1 and HMB No. 14
SMALL LOT VESTING TENTATIVE SUBDIVISION MAP

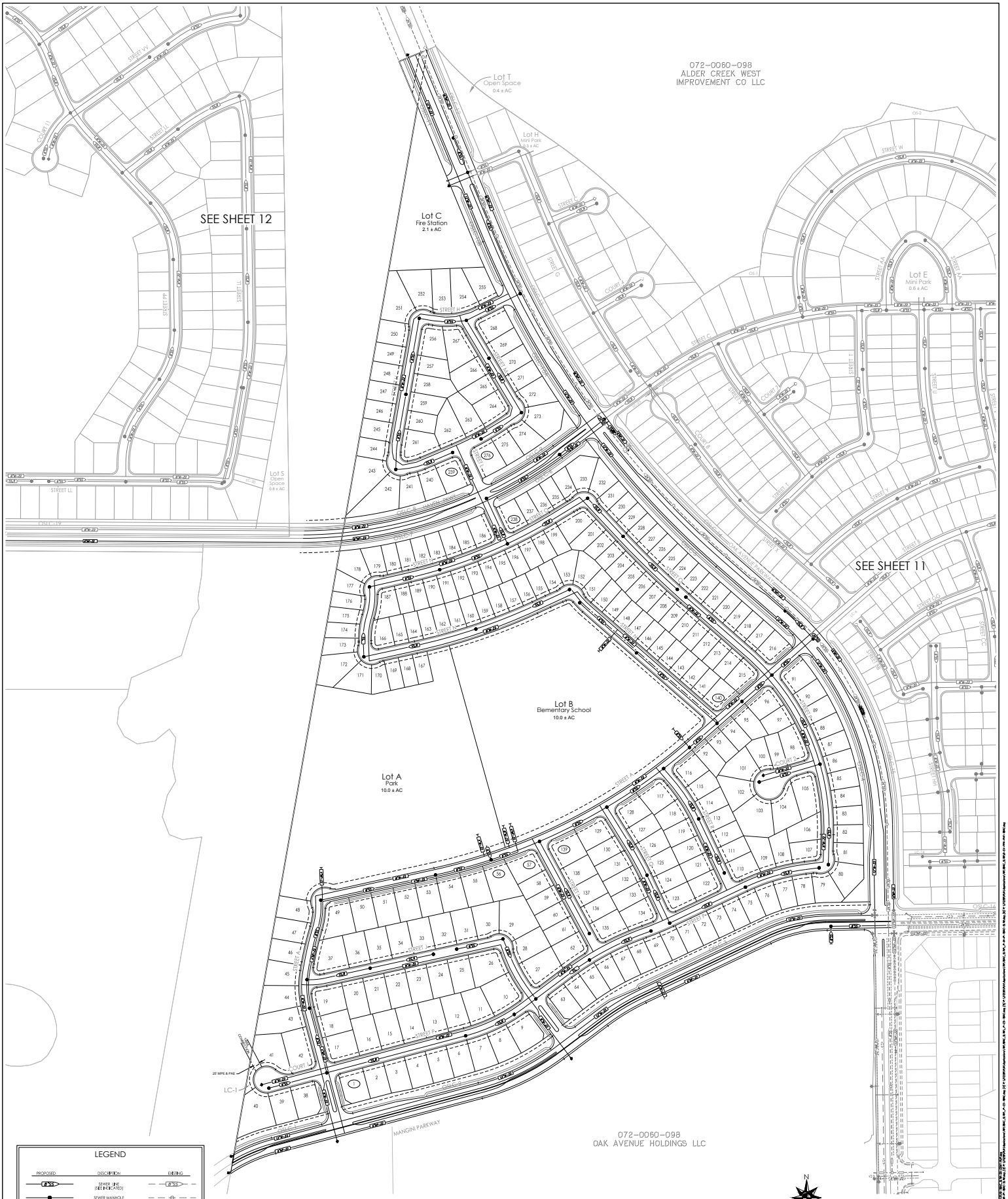
TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

MacKAY & SOMPS CIVIL ENGINEERING PLANNING SURVEYING

May 13, 2024



LEGEND

PROPOSED	DESCRIPTION	EXISTING
8"SS	SEWER LINE (SIZE INDICATED)	8"SS
	SEWER MANHOLE	
12"SD	STORM DRAIN LINE (SIZE INDICATED)	12"SD
	STORM DRAIN MANHOLE	
	DROP INLET	
	INLET/OUTLET	
	CDS UNIT	
12"W	WATER LINE (SIZE INDICATED)	12"W
16"W Z5	WATER LINE (SIZE AND ZONE INDICATED)	
16"NP Z5	NON POTABLE WATER LINE (SIZE AND ZONE INDICATED)	
	BLOW OFF VALVE	
	FIRE HYDRANT ASSEMBLY	

PRELIMINARY SANITARY SEWER, RECYCLED WATER & DOMESTIC WATER PLAN

SMALL LOT VESTING TENTATIVE SUBDIVISION MAP

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

MacKAY & SOMPS

May 13, 2026

TENTATIVE MAP NOTES

PROPOSED	DESCRIPTION	EXISTING
8"SS	SEWER LINE (SIZE INDICATED)	8"SS
	SEWER MANHOLE	
12"SD	STORM DRAIN LINE (SIZE INDICATED)	12"SD
	STORM DRAIN MANHOLE	
	DROP INLET	
	INLET/OUTLET	
	CDS UNIT	
12"W	WATER LINE (SIZE INDICATED)	12"W
16"W ZB	WATER LINE (SIZE AND ZONE INDICATED)	
16"NP ZB	NON POTABLE WATER LINE (SIZE AND ZONE INDICATED)	
	BLOW OFF VALVE	
	FIRE HYDRANT ASSEMBLY	

N

0 50 100 200
SCALE: 1"=100'

PRELIMINARY SANITARY SEWER, RECYCLED WATER & DOMESTIC WATER PLAN

VESTING TENTATIVE SUBDIVISION MAP

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

MacKAY & SOMPS
CIVIL ENGINEERING PLANNING SURVEYING

May 13, 2024

PRELIMINARY SANITARY SEWER, RECYCLED WATER & DOMESTIC WATER PLAN

SMALL LOT VESTING TENTATIVE SUBDIVISION MAP

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

MacKay & Somps

May 13, 2026

LEGEND

PROPOSED	DESCRIPTION	EXISTING
8"SS	SEWER LINE (SIZE INDICATED)	8"SS
	SEWER MANHOLE	
15"SD	STORM DRAIN LINE (SIZE INDICATED)	15"SD
	STORM DRAIN MANHOLE	
	DROP INLET	
	INLET/OUTLET	
	CDS UNIT	
12"W	WATER LINE (SIZE INDICATED)	12"W
16"W PZ	WATER LINE (SIZE AND ZONE INDICATED)	
16"NP PZ	NON POTABLE WATER LINE (SIZE AND ZONE INDICATED)	
	BLOW OFF VALVE	
	FIRE HYDRANT ASSEMBLY	

072-3190-006
BULLDOG OFFICE PROPERTIES LLC

072-3190-038
CITY OF FOLSOM

072-0231-140
ALDER CREEK WEST IMPROVEMENT CO LLC

072-3190-033
EASTON VALLEY HOLDINGS LLC

072-0231-049
EASTON PLACE DEVELOPMENT CO. LLC

072-0231-145
AEROJET ROCKETDYNE INC

072-0060-090
AEROJET ROCKETDYNE INC

Lot O
Open Space
30.2 ± AC
DE

Lot P
Open Space
8.0 ± AC
DE

Lot Q
Open Space
34.2 ± AC
DE

Lot R
Open Space
51.4 ± AC
DE

Lot K
Mini Park
0.4 ± AC

Lot L
Mini Park
0.4 ± AC

Lot J
Mini Park
0.3 ± AC

Lot I
Mini Park
0.3 ± AC

Lot C
Fire Station
2.1 ± AC

Lot S
Open Space
0.8 ± AC

SEE SHEET 9

SEE SHEET 10

SEE SHEET 9

SCALE: 1"=100'

Sheet 12 of 12

Exhibit B

Conditions of Approval

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
GENERAL REQUIREMENTS				
1.		***Final Development Plans and Recorded Map*** The owner/applicant shall submit final site development plans to the Community Development Department that shall substantially conform to the exhibits referenced below: 1. Small-Lot Vesting Tentative Subdivision Map, dated March 4, 2026 2. Preliminary Grading & Storm Drain Plan, dated March 4, 2026 3. Preliminary Sanitary Sewer, Recycled Water & Domestic Water Plan, dated March 4, 2026 4. Illustrative Master Plan Exhibit, dated March 4, 2026 5. Perimeter Wall and Fence Exhibit, dated November 6, 2025 6. Toll Brothers at Alder Creek Architectural Guidelines 7. Toll Brothers at Alder Creek Landscaping Design Guidelines 8. Retaining Walls Exhibit, dated March 2026 9. Solid Waste Management Cart Locations Exhibit, dated June 2025 10. Toll Brothers at Alder Creek Preliminary Phasing Exhibit, dated May 6, 2026 11. Folsom Plan Area Conceptual Backbone Infrastructure Phasing Plan dated May 2026 12. Minor Administrative Modification Exhibits, dated April 7, 2025 13. Street Name List, Final, dated March 17, 2026 14. Inclusionary Housing Plan Letter, dated April 15, 2026 15. Alder Creek Conformity Analysis with Appendices, dated November 19, 2025 The Small-Lot Vesting Tentative Subdivision Map, Planned Development Permit, Inclusionary Housing Plan, and Minor Administrative Modification are	G, I, M, B	CD (P)(E)

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		approved for the development of a 1,424-unit single-family residential project (Toll Brothers at Alder Creek). Implementation of the project shall be consistent with the above-mentioned items, the Folsom Plan Area Specific Plan (FPASP) as Amended, and these conditions of approval.		
2.		***Community Development Department Subsequent Review*** All civil engineering, improvement, landscape, and irrigation plans shall be submitted to the Community Development Department for review and approval to ensure conformance with this approval and with relevant codes, policies, standards and other requirements of the City of Folsom.	G, I, M	CD (P)(E)(B)
3.		***90-Day Protest Period*** The conditions of project approval set forth herein include certain fees, dedication requirements, reservation requirements, and other exactions. Pursuant to Government Code Section 66020(d), these conditions constitute written notice of the amount of such fees, and a description of the dedications, reservations and other exactions. The applicant is hereby notified that the 90-day protest period, commencing from the date of approval of the project, has begun. If the applicant fails to file a protest regarding any of the fees, dedication requirements, reservation requirements or other exaction contained in this notice, complying with all the requirements of Government Code Section 66020, the applicant will be legally barred from later challenging such exactions.	OG	CD (E)(P)
4.		***Validity and Compliance*** This approval of the Small-Lot Vesting Tentative Subdivision Map shall be valid for a period of three years or thirty-six months (**June 9, 2029**) pursuant to Folsom Municipal Code 16.16.110A, 16.20.020, and the Subdivision Map Act. The 36-month period shall restart upon City Council approval of each small-lot Final Map. The term of the Planned Development Permit shall track the term of the map. An extension to the identified time frame may be granted by the Planning Commission. If after approval of this project, a lawsuit is filed which	M	CD (P)(E)

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		seeks to invalidate any approval, building permit, or other construction permit or entitlement required in connection with any of the activities or construction authorized by the project approvals, or to enjoin the development contemplated herein, or to challenge the issuance by any governmental agency of any environmental document or exemption determination, the project approvals shall be tolled during the time that any litigation is pending, including any appeals.		
5.		***Development Rights*** The approval of this Small-Lot Vesting Tentative Subdivision Map conveys the right to map and subdivide the property, however Design Review will be required for development of the residential units. As noted in these conditions of approval for the Small-Lot Vesting Tentative Subdivision Map, the City has identified improvements necessary to develop the subject parcels. These improvements include on and off-site roadways, water, sewer, storm drainage, landscaping, sound-walls, and other improvements.	OG	CD (P)(E)(B) PW, PR, FD, PD
6.		***Indemnity for City*** The owner/applicant shall defend, indemnify, and hold harmless the City and its agents, officers and employees from any claim, action or proceeding against the City or its agents, officers or employees to attack, set aside, void, or annul any approval by the City or any of its agencies, departments, commissions, agents, officers, employees, or legislative body concerning the project which claim, action or proceeding is brought within the time period provided therefore in Government Code Section 66499.37 or other applicable statutes of limitation. The City will promptly notify the owner/applicant of any such claim, action or proceeding, and will cooperate fully in the defense. The City may, within its unlimited discretion, participate in the defense of any such claim, action or proceeding if both of the following occur: • The City bears its own attorney's fees and costs; and • The City defends the claim, action or proceeding in good faith	OG	CD (P)(E)(B) PW, PR, FD, PD

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		The owner/applicant shall not be required to pay or perform any settlement of such claim, action or proceeding unless the settlement is approved by the owner/applicant. The owner/applicant's obligations under this condition shall apply regardless of whether a Final Map is ultimately recorded with respect to this project.		
7.		***Backbone Infrastructure Plan*** The owner/applicant and all subsequent applicants, heirs, and successors with intention of developing the property are required to provide to the Community Development Department for review and approval by the Public Works Director/City Engineer a Backbone Infrastructure Plan. Additional studies and supporting documentation may also be required as part of this condition. As provided for in the ARDA, Amendment No. 1, and the FPASP, the owner/applicant shall provide fully executed grant deeds, legal descriptions, and plats for all necessary rights of way (excluding those portions of Prairie City Road that are outside the City boundary, which shall be provided by the City), public utility easements, public water main easements, public sewer easements, irrevocable offers of dedication and temporary construction easement. All required easements as listed necessary for the Backbone Infrastructure shall be reviewed and approved by the City Engineer and recorded with the Sacramento County Recorder pursuant to the timing requirements set for in Section 3.8 of the ARDA and any amendments thereto.	M	CD (E), PW
8.		***Compliance with Development Agreement*** The owner/applicant shall comply with all provisions of the Amended and Restated Tier 1 Development Agreement by and between Aerojet Rocketdyne, Inc. and Easton Development Company, LLC, and the City and any approved amendments thereafter, and the Amended and Restated Tier 1 Development Agreement by and between West Prairie Estates, LLC, and the City and any approved amendments thereafter.	M	CD (E)

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
9.		***Homeowners Associations*** The owner/applicant shall form Homeowners Associations which shall be responsible for maintenance of all private streets, maintenance of all common areas, and maintenance of any other on-site facilities throughout the life of the project to the satisfaction of the Community Development Department. Vegetation or plantings shall not be less than that depicted on the final landscape plan, unless tree removal is approved by the Community Development Department because the spacing between trees will be too close on center as they mature. In addition, Covenants, Conditions, and Restrictions (CC&R's) shall be prepared by the owner/applicant and shall be subject to review and approval by the Community Development Department for compliance with this approval and with the Folsom Municipal Code and adopted policies, prior to the recordation of the Final Map.	M	CD (P)(E)
10.		***Disclosures*** The owner/applicant shall disclose to the homebuyers in the Department of Real Estate Public Report and the CC&R's for the Toll Brothers at Alder Creek project the following items: 1) Future public parks and public schools are in relatively close proximity to the proposed project site, and that the public parks may include facilities (basketball courts, a baseball field, softball fields, soccer fields, and playground equipment) that may generate noise impacts during various times, including but not limited to evening and nighttime hours. The owner/applicant shall also disclose that the existing public parks include nighttime sports lighting that may generate lighting impacts during evening and nighttime hours. 2) The soil at the project site may contain naturally occurring asbestos and naturally occurring arsenic.	O	CD (P)(E)

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		3) The collecting, digging, or removal of any stone, artifact, or other prehistoric or historic object located in public or open space areas, and the disturbance of any archaeological site or historic property, is prohibited. 4) The project site is located close to the Mather Airport flight path and overflight noise may be present at various times. 5) The project site is in proximity to the Prairie City State Vehicular Recreation Area (PCSVRA) and that occasionally residents of the project may see dust and/or hear noise from Off Highway Vehicle use. 6) The project site is in proximity to Prairie City Road, which is used as a haul route for aggregate quarries from the south to Highway 50 to the north, and that residents may regularly encounter quarry trucks along the route and may hear truck noise. 7) The project site is in proximity to a property known as Area 40, which is a 75-acre site northeast of the intersection of White Rock Road and Prairie City Road used by Aerojet Rocketdyne for their operations in the late 1960s and early 1970s. Designated a Superfund Site in 1983 by the U.S. Environmental Protection Agency, the area's soil and groundwater are contaminated with rocket fuel materials. Clean up of the area to remove any public health concerns are in progress and being monitored by the EPA, the California Department of Toxic Substances Control (DTSC), and the Regional Water Quality Board. 8) The location of the fencing originally installed by the Applicant shall remain in the locations as shown on the individual plot plans and landscaping plans in perpetuity.		

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		9) Waste bins shall be collected and returned to the garage or other designated area (as determined by the Association) not later than twenty-four (24) hours after the collection day. 10) That all properties located within one mile of an on- or off-site area zoned or used for agricultural use (including livestock grazing) shall be accompanied by written disclosure from the transferor, in a form approved by the City of Folsom, advising the owner/applicant and renters of the potential adverse odor impacts from surrounding agricultural operations, which disclosure shall direct the transferee to contact the County of Sacramento concerning any such property within the County zoned for agricultural uses within one mile of the subject property being transferred.		
11.	✓	***Mitigation Monitoring and Reporting Program*** The owner/applicant shall participate in a mitigation monitoring and reporting program pursuant to City Council Resolution No. 2634 and Public Resources Code 21081.6. The Toll Brothers at Alder Creek Project is expressly conditioned upon compliance with all mitigation monitoring and reporting measures identified in the Folsom Plan Area Specific Plan FEIR/EIS, the South of 50 Backbone Infrastructure Project MND, and the Folsom South of U.S. Highway 50 Specific Plan Project Revised Proposed Off-Site Water Facility Alternative Amendment to the FPASP and Addendum to the FPASP EIR/EIS. Applicant shall fund on a Time and Materials basis all mitigation monitoring (e.g., staff and consultant time). The Mitigation Monitoring and Reporting Program for the Folsom Area Specific Plan FEIR/EIS can be found here: https://www.folsom.ca.us/home/showpublisheddocument/1632/637477093777200000	OG	CD (P)(E)
DEVELOPMENT COSTS AND FEE REQUIREMENTS				
12.		***Applicable Taxes, Fees, and Charges*** The owner/applicant shall pay all applicable taxes, fees and charges for the project at the rate and amount required by the FPASP Public Facilities	M	CD (P)(E)

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		Financing Plan and the Amended and Restated Development Agreements and any Amendments thereto.		
13.		***Existing Liens*** If applicable, the owner/applicant shall pay off any existing labor or materialman's liens against the property, or file necessary segregation request and pay applicable fees.	M	CD (E)
14.		***Use of Outside Legal Counsel and Consultants*** The City, at its sole discretion, may utilize the services of outside legal counsel and consultants to assist in the implementation of this project, including, but not limited to, drafting, reviewing and/or revising agreements and/or other documentation for the project. If the City utilizes the services of such outside legal counsel or consultants, the applicant shall reimburse the City for all outside legal fees and costs incurred by the City for such services. The applicant may be required, at the sole discretion of the City Attorney, to submit a deposit to the City for these services prior to initiation of the services. The applicant shall be responsible for reimbursement to the City for the services regardless of whether a deposit is required.	M	CD (P)(E)
15.		***Special Study Reimbursement*** If the City utilizes the services of consultants to prepare special studies or provide specialized design review or inspection services for the project, the applicant shall reimburse the City for actual costs it incurs in utilizing these services, including administrative costs for City personnel. A deposit for these services shall be provided prior to initiating review of mapping documents, building plans, improvement plans, or beginning inspection, whichever is applicable.	M	CD (P)(E)
16.		***Development Impact Fees*** The owner/applicant shall be subject to all Folsom Plan Area Specific Plan Area development impact fees in place at the time of approval or subsequently adopted consistent with the Public Facilities Financing Plan (PFFP), Development Agreement and amendments thereto, unless exempt by previous		

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		agreement. The owner/applicant shall be subject to all applicable Folsom Plan Area plan-wide development impact fees in effect at such time that a building permit is issued. These fees may include, but are not limited to, the Folsom Plan Area Specific Plan Fee, Specific Plan Infrastructure Fee (SPIF), Solid Waste Fee, Corporation Yard Fee, Transportation Management Fee, Transit Fee, Highway 50 Interchange Fee, General Park Equipment Fee, Housing Trust Fee, etc. Any protest to such for all fees, dedications, reservations or other exactions imposed on this project will begin on the date of final approval (**June 9, 2026**) or otherwise shall be governed by the terms of the ARDAs and any Amendments thereto. The fees shall be calculated at the fee rate set forth in the PFFP, SPIF, and the ARDAs.	M	CD (P) PW, PK
17.		***School District Fees*** The owner/applicant agrees to pay to the Folsom-Cordova Unified School District the maximum fee authorized by law for the construction and/or reconstruction of school facilities. The applicable fee shall be the fee established by the School District that is in effect at the time of the issuance of a building permit. Specifically, the owner/applicant agrees to pay any and all fees and charges and comply with any and all dedications or other requirements authorized under Section 17620 of the Education Code; Chapter 4.7 (commencing with Section 65970) of the Government Code; and Sections 65995, 65995.5 and 65995.7 of the Government Code.	M	CD (P)
MAP REQUIREMENTS				
18.		***Alder Creek West Large Lot Subdivision Map*** Prior to recordation of the Toll Brothers at Alder Creek Final Small-Lot Vesting Subdivision Maps all conditions of approval and necessary dedications from the Alder Creek West Large Lot Subdivision Map shall be completed.	M	CD (E)
19.		***Subdivision Improvement Agreement*** Prior to the approval of any Final Map, the owner/applicant shall enter into a	M	CD (E)

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		subdivision improvement agreement with the City, identifying all required improvements, if any, to be constructed with each proposed phase of development. The owner/applicant shall provide security acceptable to the City, guaranteeing construction of the improvements.		
20.		***Deferred Improvement Agreement*** Prior to the recording of the Final Map, the owner/applicant shall enter into a deferred improvement agreement with the City, identifying public improvements, if any, to be constructed with each phase. The owner/applicant shall provide security acceptable to the City, guaranteeing construction of the improvements.	M	CD (E), PW
21.		***Credit Reimbursement Agreement*** Prior to the recordation of the first Small-Lot Final Map, the owner/applicant and City shall enter into a credit and reimbursement agreement for constructed improvements that are included in the Folsom Plan Area's Public Facilities Financing Plan.	M	CD (E)
22.		***Final Map Phasing*** Should multiple Final Maps be filed by the owner/applicant, the phasing of maps shall be to the satisfaction of the Community Development Department.	M	CD (E)
23.		***Street Names*** Street names identified in Attachment 17 of the staff report shall be used for the Final Small-Lot Map.	M	CD (P)(E)
24.		***FMC Compliance*** The Final Small-Lot Map shall comply with the Folsom Municipal Code and the Subdivision Map Act. In the event of a conflict between the FMC and the Folsom Plan Area Specific Plan (FPASP), the specific plan shall govern.	M	CD (E)
25.		***FPASP Compliance*** A note shall be added to the final map that states: *This map is subject to requirements outlined in the Folsom Plan Area Specific Plan as amended December 22, 2025.*	M	CD (E)
26.		***Reciprocal Easements*** The owner/applicant shall dedicate a reciprocal access easement for common	M	CD (E)

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		use of all private access ways and internal drive aisles.		
27.		***Private Easements*** The owner/applicant shall dedicate private easements for utilities, drainage, water, and sanitary sewer on the Small Lot Final Map(s).	M	CD (E)
28.		***New Permanent Benchmarks*** The owner/applicant shall provide and establish new permanent benchmarks on the (NAVD 88) datum in various locations within the subdivision or at any other locations in the vicinity of the project/subdivision as directed by the City Engineer. The type and specifications for the permanent benchmarks shall be provided by the City. The new benchmarks shall be placed by the owner/applicant within 6 months from the date of approval of the Final Subdivision Maps.	M	CD (E)
29.		***Centralized Mail Delivery Units*** All Final Maps shall show easements or other mapped provisions for the placement of centralized mail delivery units. The owner/applicant shall provide a concrete base for the placement of any centralized mail delivery unit. Specifications and location of such base shall be determined pursuant to the applicable requirements of the U. S. Postal Service and the City of Folsom Community Development Department, with due consideration for street light location, traffic safety, security, and consumer convenience.	M	CD (E)
30.		***School District Map Copy*** Upon recordation of the Small Lot Final Map(s) and prior to building permit issuance, the owner/applicant shall provide the Folsom-Cordova Unified School District with a copy of the recorded Final Map(s).	B	CD (E)
31.		***Digital Map Copy*** Prior to the issuance of building permits, the owner/applicant shall provide a digital copy of the recorded Small Lot Final Map(s) (in AutoCAD format) to the Community Development Department. The exception to this requirement are model homes; subject to approval of the Community Development Department, building permits for model homes only may be issued prior to recording of the	B	CD (E)

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		Final Map(s).		
32.		***Inclusionary Housing Plan*** To comply with the project's inclusionary housing obligation, and consistent with the City Inclusionary Housing Ordinance (FMC Chapter 17.104) and Inclusionary Housing Plan approved for the project, the developer shall fulfill the requirement through the payment of in-lieu fees. These fees shall be paid for each building permit at time of issuance.	B	CD (P)(B)
33.		***Backbone Roadways – General Condition*** All backbone utility infrastructure is required to be installed with the roadway segments, inclusive of looping, flow, and water quality requirements per City Standards. Determination whether a backbone roadway section has been completed to the City's satisfaction shall be made by the City's designated City Engineer and/or City Construction Inspector.	O	CD (E), PW
34.		***Offsite Roadways: Oak Avenue Parkway – Mangini Parkway to Alder Creek Parkway*** a) Prior to the 40th Certificate of Occupancy where access to Vargas-Andrews Way off Oak Avenue Parkway is required: Construct Oak Avenue Parkway from the intersection of Mangini Parkway to Vargas-Andrews Way off Oak Avenue Parkway per the Modified FPASP cross section as an interim condition, with grading for four-lanes, construction of two-lanes. Improvements to include median curb with landscaping, curb, gutter and sidewalk and backbone utility infrastructure to the satisfaction of the designated City Engineer and/or City Construction Inspector. Each roadway section left or right of the median must be a minimum of 20 feet from face of curb at curb and gutter to face of curb at median. b) Prior to the 40th Certificate of Occupancy, Construct the Ultimate Condition Roundabout per City of Folsom Standards at Oak Avenue Parkway and Mangini Parkway. c) Prior to the 329th Certificate of Occupancy:	O	CD (E), PW

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		d) Construct Oak Avenue Parkway per the Modified FPASP cross section as an interim condition, with grading for four-lanes, construction of two-lanes to the northernmost boundary of Lot T, including the intersection of Haven Parkway as a roundabout. Improvements to include median curb with landscaping, curb, gutter and sidewalk and backbone utility infrastructure to the satisfaction of the designated City Engineer and/or City Construction Inspector. Each roadway section left or right of the median must be a minimum of 20 feet from face of curb at curb and gutter to face of curb at median. i. Convert the existing 16' wide sewer access road to a 20' wide Emergency Vehicle Access Road to the satisfaction of the Fire Department and the designated City Engineer and/or City Construction Inspector, from the northernmost boundary of Lot T to Alder Creek Parkway, and from Alder Creek Parkway to Prairie City Road with controlled and gated Knox Box access from both northbound and southbound directions to the satisfaction of the Folsom Fire Department and designated City Engineer and/or City Construction Inspector. e) Prior to the 1300th Certificate of Occupancy: Construct the remaining segment of Oak Avenue Parkway per the Modified FPASP cross section as an interim condition, with grading for four-lanes and construction of two lanes to Alder Creek Parkway. Improvements to include, median curb with landscaping, curb, gutter and sidewalk and backbone utility infrastructure to the satisfaction of the designated City Engineer and/or City Construction Inspector.. Each roadway section left or right of the median must be a minimum of 20 feet from face of curb at curb and gutter to face of curb at median.		
35.		***Offsite Roadways: Haven Parkway – Oak Avenue Parkway to Prairie City Road***		

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		a) Prior to the First Certificate of Occupancy requiring access from Haven Parkway: i. Construct Haven Parkway from Oak Avenue Parkway to the first required access on Haven Parkway. ii. Construct Ultimate condition Roundabout per City of Folsom Standards at Oak Avenue Parkway and Haven Parkway. b) Prior to the 663rd Certificate of Occupancy: Construct Haven Parkway from first access/prior terminus/Oak Avenue to Prairie City Road per the FPASP Cross-Section, including a Class I trail on the north side of Haven Parkway. Improvements to include, median curb with landscaping, curb, gutter and sidewalk and backbone utility infrastructure. Landscaping, curb, gutter, and sidewalk on the south side of Haven Parkway will be completed by others with the development of the abutting property. c) Prior to the 663rd Certificate of Occupancy: Construct a Traffic Signal with ultimate pole location and interim mast arm and signal head configuration per the FPASP at the intersection of Haven Parkway and Prairie City Road.	O	CD (E), PW
36.		***Offsite Roadways: Mangini Parkway – Oak Avenue Parkway to Western Project Boundary*** Prior to the First Certificate of Occupancy that requires access from Mangini Parkway west of the Oak Avenue Parkway intersection: Construct Mangini Parkway from Oak Avenue Parkway to the western project boundary per the FPASP cross section or per a superseded cross section as adopted through a Specific Plan Amendment or other acceptable means modifying the cross section, with a Fire Department Approved Turnaround at the terminus and demonstrate that internal minor roadways serve as an Emergency Vehicle Access Road that will directly connect to Oak Avenue Parkway.	O	CD (E), PW
37.		***Offsite Roadways: Alder Creek Parkway – Oak Avenue Parkway to Prairie City Road***		

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		a) Prior to the First Certificate of Occupancy that requires access from Alder Creek Parkway: Construct Alder Creek Parkway from Prairie City Road to the subdivision access road as a half-section (southern side) per the modified FPASP cross section of 82' right of way and connect to the Emergency Vehicle Access Road. Improvements to segment shall include median curb, curb, gutter, and Class I pedestrian bike trail and as well as backbone utility infrastructure. Improvements at this stage also include: i. Relocate the existing 69kV electrical overhead and all communication facilities as needed to accommodate the full 82' ultimate right of way. ii. If northerly side of Alder Creek Parkway has been constructed prior to the installation of the southerly two lanes, the median landscaping will be required to be installed. iii. Construct a Traffic Signal per the FPASP at the intersection of Alder Creek Parkway and Prairie City Road with signal poles set at the ultimate cross section right of way location. b) Prior to the 1260th Certificate of Occupancy: i. Construct Alder Creek Parkway as a half-section (southern side) per the modified FPASP cross section of 82' right of way from the prior terminus to the intersection of Oak Avenue Parkway. Improvements to segment shall include median curb, curb, gutter, and Class I pedestrian bike trail as well as backbone utility infrastructure. ii. Construct Ultimate condition Roundabout per City of Folsom Standards at Oak Avenue Parkway and Alder Creek Parkway.	O	CD (E), PW
38.		***Offsite Roadways: Prairie City Road – Hydromodification Basin #14 to Alder Creek Parkway*** Prior to the 663rd Certificate of Occupancy: a) Construct Prairie City Road from Hydromodification Basin #14 to the	O	CD (E), PW

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		intersection of Alder Creek Parkway. Prairie City Road shall be built as a 2-lane facility half-section on the westerly side per the FPASP cross section or per a superseded cross section as adopted through a Memorandum of Understanding between Sacramento County and the City of Folsom not to exceed two lanes. Improvements to include, median curb, curb, gutter and sidewalk, backbone utility infrastructure and bicycle and pedestrian facilities per FPASP, and any necessary roadway alignment transitions in accordance with City Standards and AASHTO Design Guidelines. b) Relocate the existing 69kV overhead utilities and poles along the improved length of Prairie City Road to the satisfaction of SMUD. c) If mutually agreed upon by the Developer and the City, the Developer may elect to enter into a development agreement with the City for the City to deliver the conditioned improvements on Prairie City Road on the Developer's behalf and as described above.		
39.		***Utility Infrastructure*** • Utilities shall be constructed concurrent with the roadway phasing, as deemed appropriate and necessary to support the particular phase by the City Engineer. • A particular development phase may be developed into sub-phases in which the roadway and utility phasing may change. If sub-phasing is proposed, the City Engineer shall determine what roadway and utility improvements are appropriate and necessary to serve the sub-phase.	G, I, M	CD(E), PW, FD
SITE DEVELOPMENT REQUIREMENTS				
40.		***Phasing Plan*** The owner/applicant shall prepare a complete and comprehensive phasing plan and shall submit the phasing plan to the City for each proposed phase of development. The phasing plan shall include all required infrastructure for each proposed phase of development. The infrastructure shall include all required on-site and off-site improvements, including but not limited to, water system	G, I, M	CD(E), EWR, PW, FD

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		improvements (distribution and transmission mains, booster pump stations, water reservoirs, tanks, pumps, PRV stations, etc.), sanitary sewer improvements (sewer mains, lift stations, forced mains, etc.) roadway and transportation improvements, storm drainage improvements (detention/water quality basins, outfalls, etc.) and all other necessary improvements required for each phase of development. The phasing plan shall be reviewed and approved by the City. The Public Works Director/City Engineer may condition the phasing to ensure that each phase functions independently and is consistent with the minimum utility and access standards of the City. All maps filed in phases will be required to have two points of access for emergency vehicle access and/or general traffic purposes and all off-site utilities deemed necessary as determined by the City Engineer. Improvement plans for all future phases that include half sections of local residential streets shall include a minimum of 15 feet of pavement over the centerline, to allow two-way traffic and shall be subject to approval of the Community Development Department and Fire Department. The City will not dictate the order of the phasing except that the first phase shall construct necessary supporting backbone infrastructure to that phase.		
41.		***Geotechnical Report*** Prior to the issuance of any grading, improvement permit, and/or building permit, the owner/applicant shall have a geotechnical report prepared by an appropriately licensed engineer that includes an analysis of site suitability, proposed foundation design for all proposed structures, and roadway and pavement design. The geotechnical report shall be inclusive of any proposed wall calculations. The report and calculations are subject to review and approval by the Community Development Department.	G, I	CD (E)
42.		***Naturally Occurring Asbestos*** This project is located in a geologic unit within the boundaries of the City of Folsom, which is moderately likely to contain naturally occurring asbestos. The		

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		owner/applicant shall be required to obtain approval from the Sacramento Metropolitan Air Quality Management District (SMAQMD) prior to approval of any grading and/or construction on the project site. The owner/applicant shall provide to the Community Development Department a copy of the written approval from SMAQMD prior to approval of grading and/or site improvement plans.	G, B	CD (E)
43.		***Compliance with Standard Specifications and Details*** Public and private improvements, including roadways, curbs, gutters, sidewalks, bicycle lanes and trails, streetlights, underground infrastructure and all other improvements shall be provided in accordance with the current edition of the City of Folsom *Standard Construction Specifications* and the *Design and Procedures Manual and Improvement Standards*.	I, B	CD (P)(E)
44.		***Improvement Plan Review*** The improvement plans for the required public and private subdivision improvements necessary to serve any and all phases of development shall be reviewed and approved by the Community Development Department prior to approval of a Final Map.	I, B	CD (E)
45.		***Material Storage Areas*** The owner/applicant shall locate staging and material storage areas as far away from sensitive biological resources and sensitive land uses (e.g., residential areas, schools, parks) as feasible. Staging and material storage areas shall be screened from adjacent occupied land uses in earlier development phases to the maximum extent practicable. Screens may include, but are not limited to, the use of visual barriers such as berms or fences. Staging and material storage areas shall be shown on all grading and/or improvement plans prior to plan approval by the City.	G	CD (P)(E)(B)
46.		***Landslide /Slope Failure*** The owner/applicant shall retain an appropriately licensed engineer during the grading activities to identify existing landslides and potential slope failure hazards. The said engineer shall be notified a minimum of two days prior to any	G	CD (E) PW

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		site clearing or grading to facilitate meetings with the grading contractor in the field. If blasting is required to complete final grading of the site, the owner/applicant shall notify the City and coordinate with the City Engineer throughout the blasting activities for the duration of the operation. Notification to developed properties (existing homes and businesses) within a certain radius of the blasting activity may be required to the satisfaction of the City Engineer.		
47.		***Mining Activity Remediation*** The owner/applicant shall locate and remediate all antiquated mine shafts, drifts, open cuts, tunnels, and water conveyance or impoundment structures existing on the project site, with specific recommendations for the sealing, filling, or removal of each that meet all applicable health, safety, and engineering standards. Recommendations shall be prepared by an appropriately licensed engineer or geologist. All remedial plans shall be reviewed and approved by the City Engineer prior to approval of grading plans.	G	CD (E)
48.		***State and Federal Permits*** The owner/applicant shall obtain all required State and Federal permits and provide evidence that said permits have been obtained, or that the permit is not required, subject to staff review prior to approval of any grading or improvement plan.	G, I	CD (P)(E)
49.		***Retaining Wall Review*** The final location, design, height, materials, and colors of retaining walls are subject to review and approval by the Community Development Department.	G, I, B	CD (P)(E), FD
50.		***Walls/Fences/Gates*** The final location, design, height, materials, and colors of the walls, fences, and gates shall be consistent with the submitted Perimeter Wall and Fence Exhibit and Retaining Walls Exhibit subject to review and approval by the Community Development Department.	I, B	CD (P)(E)
51.		***Replacement of Damaged Facilities*** The owner/applicant shall be responsible for replacing any and all damaged or hazardous public sidewalk, curb and gutter, and/or bicycle trail facilities along	OG	CD (E)

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		the site frontage and/or boundaries, including pre-existing conditions and construction damage, to the satisfaction of the Community Development Department.		
52.		***Improvement Completion*** Separate from backbone infrastructure requirements, on-site public and private improvements, including roadways, curbs, gutters, sidewalks, bicycle lanes and on-street/on-site trails, streetlights, underground infrastructure, and all other improvements shall be completed prior to the first Certificate of Occupancy for the appropriate phase of the project, as determined by the designated City Engineer and/or City Construction Inspector.	O	CD(P)(E)
53.		***Off-site improvements / Rights of Entry*** For any improvements constructed on private property that are not under the ownership or control of the owner/applicant, all rights-of-entry, and if necessary, a permanent easement shall be obtained and provided to the City. All rights of entry, construction easements, either permanent or temporary and other easements shall be obtained as set forth in applicable ARDAs, which shall be fully executed by all affected parties and shall be recorded with the Sacramento County Recorder, where applicable, prior to approval of grading and/or improvement plans.	G, I	CD (E)
54.		***Management of Tribal Cultural Resources*** Should any indications of possible tribal cultural resources (TCRs), such as cultural features, unusual amounts of bone or shell, or cultural belongings be encountered during any construction activities, work shall be suspended in the vicinity of the find and the appropriate oversight agency(ies) shall be notified immediately. The appropriate oversight agency(ies) shall retain a tribal representative or Tribal Historic Preservation Officer (THPO) who shall assess the significance of the find by evaluating the resource to determine if it is a TCR as defined in Section 21074 of the Public Resources Code. If the resource is a TCR as defined in state law, and it would be subject to disturbance or	DC	CD (P)(E)

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		destruction, the City shall consult with the THPO or their designee to determine the appropriate treatment before resuming construction activities at the TCR.		
		FIRE DEPARTMENT REQUIREMENTS		
55.		***Fire Station Dedication*** A fire station site shall be dedicated on the Final Map consistent with the project's location as shown on the Small-Lot Vesting Tentative Subdivision Map with improvements completed and access points located to the satisfaction of the City of Folsom Fire Department.	M	CD (E), FD
56.		***Prepare Fuel Modification Plan (FMP)*** The owner/applicant shall submit a Fuel Modification Plan consistent with the FPA Open Space Management Plan to the City for review and approval by the City. Final approval of the plan shall occur prior to the issuance of a building permit for any new construction. A Fuel Modification Plan shall consist of a set of scaled plans showing fuel modification zones indicated with applicable assessment notes. A fuel modification plan submitted for approval shall be prepared by one of the following: a California state licensed landscape architect, or state licensed landscape contractor, or a landscape designed, or an individual with expertise acceptable to the Fire Code Official. Notification of fuel modification requirements are to be made upon sale to new property owners. Proposed changes to the approved Fuel Modification Plan shall be submitted to the City for approval prior to implementation. The owner/applicant shall dedicate a 30-foot-wide fuel modification easement(s) for all residential properties located adjacent to open space areas within the development. The owner/applicant shall dedicate easements, if applicable, for the required fuel modification buffer. The fuel modification setback shall be shown on the Final Map.	M, B	CD (P) FD

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Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		The owner/applicant shall be responsible for the maintenance of the fuel modification areas until such time that the City takes ownership of the open space areas that are to be deeded to the City within the project site.		
57.		***All-Weather Access and Fire Hydrants*** The owner/applicant shall provide all-weather access and fire hydrants before combustible materials are allowed on any project site or other approved alternative method as approved by the Fire Department. All-weather emergency access roads and fire hydrants (tested and flushed) shall be provided before combustible material or vertical construction is allowed on any project site or other approved alternative method as approved by the Fire Department. (All-weather access is defined in Folsom Municipal Code (FMC) Section 8.36.080 which references City modifications to Chapter 33 (Fire Department Site Access and Water Supply), Section 3307 of the Fire Code.	G, I, M, B	CD (P) (E), FD
58.		***Illuminated Addressing*** Buildings shall have illuminated addresses visible from the street or drive fronting the property. Size and location of address identification shall be reviewed and approved by the Fire Department.	B	CD (P) (E), FD
59.		***Fire Flow*** Residential Fire-Flow with Automatic Fire Sprinkler System: The required fire-flow for the proposed residential portion of the project is determined to be 875 GPM for one hour.	B	CD (P) (E), FD
60.		***Street Length*** The maximum length of any dead-end street shall not exceed 500 feet in accordance with the Folsom Fire Code (unless approved by the Fire Department).	M, I	CD (P) (E), FD
LANDSCAPE/TREE PRESERVATION REQUIREMENTS				
61.	✓	***Individual Oak Trees – Removal of or Work Near Individual Oak Trees*** Prior to commencement of any grading or site improvement activities, the owner/applicant shall obtain a tree removal permit and/or tree work permit, mitigate for removal of or for work on individual isolated oak trees (i.e., those	G, I	CD (A) (P) (E)

Cond. #	Mitigation Measure	Condition of Approval	When Required	Responsible Department
		not located within the delineated boundary of the oak woodland habitat) consistent with Mitigation Measure 3A.3-5 of the Mitigation Monitoring and Reporting Program and the Oak Woodlands Mitigation section of the Folsom Plan Area Specific Plan (FPASP). Such permits shall be issued consistent with the requirements of Chapter 12.16 of the City of Folsom Municipal Code for Tree Preservation. Per FMC Chapter 12.16, Tree Removal and Tree Work Permit Applications must contain an application form, justification statement, site map, count of isolated oak trees removed, preservation program, and arborist's report. Application(s) shall be submitted to the City of Folsom by the owner/applicant for issuance of ~~a~~ Tree Permits prior to commencement of any grading or site improvement activities.		
62.	✓	***Oak Woodland Canopy – Preservation and Protection*** Consistent with Mitigation Measure #1 in the FPASP, the owner/applicant shall protect and minimize indirect impacts to trees to be preserved and shall be required to do the following: ✓ Comply with Mitigation Measure 3A.3-5: Conduct Tree Survey, Prepare and Implement an Oak Woodland Mitigation Plan, and Implement Measures to Avoid and Minimize Indirect Impacts on Oak Trees Retained On Site. o For the detailed requirements refer to Mitigation Measure 3A.3-5 on p. 22 of the *Mitigation Monitoring and Reporting Program for the Folsom South of U.S. Highway 50 Specific Plan Project (MMRP)*.	G, I, OG	CD (A) (P) (E)
63.	✓	***Mitigation for Oak Woodland Impacts*** To mitigate for the loss of oak woodland canopy from the proposed development activities, the owner/applicant shall implement one or a	G, I, OG	CD (A) (P) (E)

Cond. #	Mitigation Measure	Condition of Approval	When Required	Responsible Department
		combination of the following measures in accordance with the FPASP and Mitigation Measure 3A.3-5 from the MMRP: 1. Secure existing and unprotected oak woodland habitat within Sacramento and/or El Dorado counties through a conservation easement. Off-site preserved locations shall be managed as oak woodland habitat in perpetuity; and/or 2. Plant a combination of oak acorns, seedlings, and oak trees at off-site location(s), following the Oak Woodland Mitigation Planting Criteria below. Planted areas would be placed under conservation easements and managed as oak woodlands in perpetuity. *Oak Woodlands Mitigation Planting Criteria:* A minimum of 55 planting sites per acre (with a total of 70-units) will be required with additional minimum requirements of #1, #5 and #15 container plantings. Mitigation acreage that is planted solely with larger oak trees (no acorns) will have minimum of 35 planting sites per acre. Plantings will have unit values as outlined below: a. One established acorn equals one unit (acorns will be over planted to maximize potential germination). b. One oak seedling in a #1 container equals two units (minimum of 10% required). c. One #5 container oak tree equals three units (minimum of 10% required). d. One #15 container oak tree equals four units (minimum of 10% required). e. One 24-inch boxed oak tree equals six units.		

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		f. One transplanted oak tree equals four units per trunk diameter inch (DBH). g. The planting of non-oak species will be required as a component of oak woodland mitigation in order to augment the overall habitat value of these areas. Appropriate non-oak species will be determined by the city at the time of mitigation planting. Each non-oak planting will represent unit values as described above for oak trees, but no more than 10% of planting may be non-oak species to count as mitigation. Ratios of planting types will vary based upon site specific conditions which will require an evaluation of several factors including irrigation needs, access, soil types, and evidence of natural oak recruitment. Some areas may be determined (in consultation with the City arborist) to be best suited for acorn planting only. These areas will not be subject to the minimum planting requirement of #1, #5, and #15 container stock. Mitigation acreage will be monitored for eight years to ensure that a minimum of 80% of planted unit values are successfully established. Trees surviving after eight years, with a minimum of three years without maintenance or irrigation will be considered successfully established.		
64.	✓	***Protection of Trees and Conservation Areas*** The Conservation Areas shall be fenced prior to construction. In addition, the Passive Recreation Open Spaces shall be fenced with high-visibility fencing prior to starting construction.	DC	CD (A) (P) (E)

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		To avoid and minimize indirect impacts on protected trees to remain on the SPA, the project applicant(s) of all affected project phases shall establish a Tree Protection Zone by installing high visibility fencing outside the outer edge of the drip lines of all trees to be retained on the SPA during project construction. The fencing may be installed around groups or stands of trees or whole wooded areas and must be installed so that the drip lines of all trees are protected. Grading, trenching, equipment or materials storage, driving or operation of vehicles, parking, paving, irrigation, and landscaping shall be prohibited within the fenced areas (i.e. drip lines of protected trees) at all times. No-entry signs shall be posted on exclusion fencing stating that the enclosed trees are to be preserved. Signs shall state the penalty for damage to, or removal of, the protected tree. Said fencing shall be inspected by the City Urban Forester prior to any equipment staging or earth work.		
65.	✓	***Affected Oak Trees*** The owner/applicant shall retain an ISA certified project arborist for the duration of the project to oversee all onsite tree removal, preservation and monitoring efforts. Where site work activities (including but not limited to grading, trenching, equipment/materials storage, vehicle operation, paving, or utility/irrigation installation) cannot be avoided within the dripline of a native oak tree, that tree shall be counted as an “Affected Tree”. Affected Trees shall be surveyed by the Project Arborist prior to the commencement of the encroaching site work and monitored for a period of five years following the completion of said work. Any Affected Tree that declines in health or dies within this five-year monitoring period shall be mitigated at the "per diameter inch" rate for Isolated Oak Trees as set forth in the FPASP.	DC	CD (A) (P) (E)

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66.		***Landscaping Plans*** Final landscape plans and specifications shall be prepared by a registered landscape architect and approved by the City prior to the approval of the first building permit. Said plans shall include all on-site landscape specifications and details including a tree planting exhibit demonstrating sufficient diversity and appropriate species selection to the satisfaction of the Community Development Department. The tree exhibit shall include all street trees, accent trees, parking lot shading trees, and mitigation trees proposed within the development. The owner/applicant shall comply with the most current State Model Water Efficient Landscape Ordinance (MWELO) and all applicable ordinances, policies, and design standards related to landscape and water conservation. This includes adherence to all prevailing state and local regulations, including Governor's declarations and drought-response mandates, as well as all Specific Plan, Folsom Municipal Code, and city standard requirements pertaining to landscape design and tree planting.	I, OG	CD (A)(P), PW
67.		***Utility Conflicts*** Utilities shall not be placed or run through landscape areas in such a way as to conflict with applicable landscaping or parking lot shade tree requirements. Adequate separation between utilities is required to meet the City of Folsom standards.	I, B	CD (P)(E)
68.		***Vertical Curb*** All curbs located adjacent to landscaping, whether natural or manicured, and where parking is allowed shall be vertical except as approved by the Community Development Department.	I	CD (P)(B)
69.		***Right of Way Landscaping*** Except for the area outside the City right-of-way on the western side of Prairie City Road, landscaping along all road rights of way and in public open space lots shall be installed when the adjoining road or lots are constructed. This shall include landscaping of the ultimate width of the median area between north and	I, OG	CD (P), PW

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		southbound lanes with future lane areas limited to groundcover to the satisfaction of the Public Works Director.		
70.		***Landscape Maintenance*** The owner/applicant or HOA(s) if established shall be responsible for on-site, private common area landscape maintenance throughout the life of the project to the satisfaction of the Community Development Department. Vegetation or planting shall not be less than that depicted on the final landscape plan unless tree removal is approved by the Community Development Department because the spacing between trees will be too close on center as they mature. Any protected trees as defined under Folsom Municipal Code 12.16 shall require an approved tree permit issued by the Community Development Department prior to removal. Street frontage trees, parking lot shade trees, and any other regulated trees as defined within Folsom Municipal Code 12.16.020 or within these conditions shall be maintained according to the most current American National Standards for Tree Care Operations (ANSI A-300) by qualified tree care professionals. Tree topping for height reduction, view protection, light clearance or any other purpose shall not be allowed. Specialty-style pruning, such as pollarding, shall be specified within the approved landscape plans and shall be implemented during a 5-year establishment and training period. The Conditions, Covenants and Restrictions (CC&Rs) covering the project development(s) shall include language that tree maintenance is the responsibility of the property owner for any trees on private property, in compliance with city standards.	OG	CD (A)
ARCHITECTURAL/SITE DESIGN REQUIREMENTS				
71.		***Design Review Approval*** Prior to issuance of a building permit for any residential units within the		

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		subdivision, the owner/applicant shall obtain Design Review and/or Planned Development approval from the Planning Commission for all residences to be built within the subdivision. If the architecture is not consistent with the Toll Brothers at Alder Creek Architectural Guidelines as approved, the owner applicant may modify the plans or apply for modification to the Architectural Guidelines to be approved by the Planning Commission.	B	CD (P)(B)
72.		***Front Yard Trees*** A minimum of one tree shall be planted in the front yard of each residential lot within the subdivision. A minimum of two trees are also required along the street-side of all corner lots. All front yard irrigation and landscaping shall be installed prior to a Building Permit Final. Plot Plans shall show required street trees.	B	CD (P)
73.		***Lighting Plan*** The owner/applicant of all project phases shall submit a lighting plan for the project to the Community Development Department. The lighting plan shall be consistent with the Folsom Ranch Central District Design Guidelines: 1. Shield or screen lighting fixtures to direct the light downward and prevent light spill on adjacent properties; 2. Place and shield or screen flood and area lighting needed for construction activities, nighttime sporting activities, and/or security so as not to disturb adjacent residential areas and passing motorists; 3. For public lighting in residential neighborhoods, prohibit the use of light fixtures that are of unusually high intensity or that blink or flash; 4. Use appropriate building materials (such as low-glare glass, low-glare building glaze or finish, neutral, earth-toned colored paint and roofing materials), shielded or screened lighting, and appropriate signage in the office/commercial areas to prevent light and glare from adversely affecting motorists on nearby roadways; and 5. Design exterior on-site lighting as an integral part of the building and landscaping design in the Specific Plan Area. Lighting fixtures shall be	I	CD (P)

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		architecturally consistent with the overall site design. Lights used on signage should be directed to light only the sign face with no off-site glare.		
74.		***Monument Signage*** The final location, height, size, and design of any future monument sign shall be subject to review and approval by the Community Development Department to ensure consistency with the requirements of FMC Section 17.59.040 D. In addition, the owner/applicant shall obtain a sign permit prior to installation of any monument sign.	B	CD (P)
75.		***Mechanical Equipment Screening*** All mechanical equipment shall be concealed from view of public and private streets, neighboring properties and nearby higher buildings where practicable to the satisfaction of the Community Development Department.	O	CD (P)
PARKS AND RECREATION DEPARTMENT				
76.		***Local/Mini Parks*** The areas shown as local or mini parks in the Toll Brothers at Alder Creek application are not required park land and therefore do not qualify for parkland dedication credit. Additionally, required park land may not be substituted by the areas shown as local or mini parks in the application. The local and/or mini parks shall be owned and maintained by a Homeowner's Association. The dedication of the 10-acre park site, known as Neighborhood Park 5, will meet the requirements for park land dedication for this development.	M, O	CD(E), PR
77.		***Parkland Dedication – Neighborhood Park 5*** The following measures shall be implemented to the satisfaction of the Parks and Recreation Department: 1. Parkland Dedications shall be calculated as net acreage. 2. Dedication of the 10-acre park site, known as Neighborhood Park 5, shown as Lot A Park on the Small Lot Vesting Tentative Subdivision Map dated March 4, 2026.	M	PR

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		3. As identified in the Municipal Code Section 16.32.040 Subsection K, at the time of the final subdivision map or parcel map of a subdivision adjacent or contiguous to the park site, the subdivider shall dedicate the land as required by the city council. The Neighborhood Park 5 site shall be dedicated entirely at one time and as one parcel. 4. As identified in the Folsom Plan Area Specific Plan Policy 9.14, at the time of dedication, park land shall exclude easements, wetlands, public rights-of-way, and steep slopes or structures. 5. As identified in the Folsom Plan Area Specific Plan Policy 9.13, if the existing slope of the park site exceeds five percent, the site shall be rough graded by the owner/developer/builder dedicating the park land in accordance with grading plans approved by the City of Folsom Parks and Recreation Department. 6. As identified in the Folsom Plan Area Specific Section 9.3, at the time of dedication, the park site shall have no existing oak trees, that would interfere with active uses. There will be no reimbursement from the City for permitting, tree removal, or other efforts to meet this requirement. 7. Owner/applicant shall provide to the City a topographic survey in an electronic file compatible with AutoCAD upon completion of the rough grading. 8. All subdivision utilities (i.e. Potable Water, Non-potable Water, Sewer, Storm Drain, Public Utilities, etc.) shall be extended at least 5 feet past Right of Way by owner/applicant at a location coordinated with Parks and Recreation staff and approved by the Parks and Recreation Director. 9. Access streets, curb, gutter, and sidewalk with ADA compliant curb ramps at crosswalks, in compliance with the City Design Standards, shall be brought into the park site by owner/applicant at a location coordinated with Parks and Recreation staff and approved by the Parks and Recreation Director.		

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		10. A Type 2 vertical curb and gutter, in compliance with City Design Standards, will be constructed along the park right-of-way. 11. Any residential parcel contiguous to the Neighborhood Park 5 site shall have a six-foot minimum height concrete masonry wall constructed along the property line adjacent to the park site. There will be no reimbursement from the City for design, permitting, construction, or other efforts to meet this requirement.		
78.		***Class I Trail Access*** All Class I trails must remain publicly accessible at all times. Additionally, these trails should be designed to accommodate access for both City maintenance and emergency response vehicles. As shown in the Small Lot Vesting Tentative Subdivision Map, open space areas should include more than two points of ingress and egress to ensure adequate connectivity and accessibility with minor modifications allowed subject to Parks Department review and approval.	I, B, OG	PR
POLICE/SECURITY REQUIREMENTS				
79.		***Security Measures*** The owner/applicant shall consult with the Folsom Police Department prior to the start of site work and vertical construction to incorporate all reasonable crime prevention measures. The following security/safety measures shall be considered: 1. A security guard shall be on duty at all times at the site or a six-foot security fence shall be constructed around the perimeter of construction areas. 2. Institute security measures for the safety of all construction equipment and unit appliances. 3. Landscaping shall not cover exterior doors or windows, block line-of-site at intersections or screen overhead lighting.	G, I, B, OG	PD
TRAFFIC, ACCESS, CIRCULATION AND PARKING REQUIREMENTS				
80.		***Roundabout and Traffic Signal Design***	M	CD (E), PW, FD

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		Except for Prairie City Road which shall have signalized intersections, all major roadway intersections shall use roundabouts consistent with the City's Roundabout Standards unless an intersection control evaluation demonstrates that a roundabout is not suitable for that intersection. At minimum, roundabouts are required at the following intersections consistent with the Folsom Plan Area Specific Plan: 1. Mangini Parkway and Oak Avenue Parkway 2. Haven Parkway and Oak Avenue Parkway 3. Alder Creek Parkway and Oak Avenue Parkway The following intersections will require traffic signals in connection with Prairie City Road improvements and the Memorandum of Understanding dated [DATE] between the City of Folsom and the County of Sacramento for shared use facility: 1. Prairie City Road and Haven Parkway 2. Prairie City Road and Alder Creek Parkway, this intersection shall be constructed consistent with said MOU and the Folsom Plan Area Specific Plan. Prior to approval of the Final Map, the design of all roundabouts shall be reviewed and approved by the Community Development Department, the Public Works Department, and the Fire Department. The design shall include proposed lane configurations, proposed driveways, and any proposed landscape/hardscape features.		
81.		***Class II Bike Lanes*** All Class II bike lanes shall be striped, and the legends painted to the satisfaction of the Community Development Department. No parking shall be permitted within the Class II bike lanes.	I	CD(E)(P)
82.		***Prepare Traffic Control Plan***		

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		Prior to construction, a Traffic Control Plan for existing roadways and intersections affected by construction shall be prepared. The Traffic Control Plan shall designate haul routes and sites and comply with requirements in encroachment permits issued by the City, if applicable. The Traffic Control Plan to be prepared by the project construction contractor(s) shall, at minimum, include the following measures: 1. Maintaining the maximum amount of travel lane capacity during non-construction periods, possible, and advanced notice to drivers through the provision of construction signage and minimal disruption to the public. 2. Maintaining alternate one-way traffic flow past the lay down area and site access when feasible. 3. Heavy trucks and other construction transport vehicles shall avoid the busiest commute hours (7 a.m. to 8 a.m. and 5 p.m. to 6 p.m. on weekdays). 4. A minimum 72-hour advance notice of access restrictions for residents, businesses, and local emergency response agencies. This shall include the identification of alternative routes and detours to enable for the avoidance of the immediate construction zone. 5. A phone number and community contact for inquiries about the schedule of the construction throughout the construction period. This information will be posted in a local newspaper, via the City's web site, or at City Hall and will be updated on a monthly basis.	G, I	CD (E)
83.		***Oak Avenue Pedestrian Crossing*** Near Intersection #5 (Oak Avenue Parkway at Lot T), the Specific Plan identifies an at-grade pedestrian crossing. This crossing may see frequent use by trail users, cyclists, and local residents, active crossing control is needed based on the recommendation from Kimley-Horn's traffic study for the project. As a result and based on the FHWA Guidance 7, a rectangular rapid-flashing beacon (RRFB) or a pedestrian hybrid beacon shall be installed due to the combination of projected through vehicular volume, roadway width, and other	I	CDD, PW, PR

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		roadway characteristics of Oak Avenue Parkway. Furthermore, the Project shall install high-visibility crosswalk markings, warning signs, and lighting for pedestrian safety at this intersection.		
DRY UTILITY REQUIREMENTS				
84.		***Coordination with Utility Agencies*** The owner/applicant shall coordinate the planning, development and completion of this project with the various utility agencies (i.e., SMUD, PG&E, etc.). The owner/applicant shall provide the City with written confirmation of public utility service prior to approval of the Final Map.	OG	PR, PW
85.		***Dry Utility Connections*** Future dry utility connection services (electrical, gas if available, telephone, etc.) for new buildings shall be placed underground at the project site.	B	CD (E)
86.		***Future Utility Lines*** All future utility lines lower than 69 KV that are to be built within the project, shall be placed underground within and along the perimeter of the project at the developer's cost. The owner/applicant shall dedicate to SMUD all necessary underground easements for the electrical facilities that will be necessary to service development of the project.	I, O	CD (E)
87.		***Public Utility Easements*** The owner/applicant shall dedicate public utility easements for underground facilities on properties adjacent to the public streets. A minimum of twelve and one-half-foot (12.5') wide Public Utility Easements for underground facilities (i.e., SMUD, Pacific Gas and Electric, cable television, telephone) shall be dedicated adjacent to all public rights-of-way. The owner/applicant shall dedicate additional width to accommodate extraordinary facilities as determined by the City. The width of the public utility easements adjacent to public right-of-way may be reduced with prior approval from public utility companies. PG&E recommends the following language be expressly stated in the offer of dedication for PUEs:	I	CD (E)

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		• I/We the undersigned, as Owner(s) of the land shown hereon, do hereby state that I/we am/are the only person(s) whose consent is necessary to pass clear title to said land and do hereby consent to the preparation and recordation of this map and offer for dedication and do hereby dedicate for public uses the Public Utility Easements (PUEs) shown on this map for public utility purposes including electric, gas, communication facilities and all other public utility purposes; together with any and all appurtenances thereto, including the right from time to time to trim and to cut down and clear away or otherwise control any trees or brush. The PUEs hereby offered for dedication are to be kept open and free of buildings, or any other structures of any kind. The final map must contain such a statement setting forth the offer of dedication and such offer must be accepted by the county or municipality.		
88.		***PG&E Requirements*** 1. PG&E operates high-voltage electric transmission lines within easements on the subject properties. No buildings or other structures of any kind, including but not limited to the footprint and eave of any buildings, swimming pools, wells or similar structures will be permitted within PG&E's easement areas. PG&E's transmission easement shall be designated on subdivision/parcel maps as "RESTRICTED USE AREA – NO BUILDING." 2. Cuts, trenches or excavations may not be made within 25 feet of PG&E towers. Final grading plans, signed and dated, must be submitted for PG&E's review. PG&E engineers must review grade changes in the vicinity of our towers. No fills will be allowed which would impair ground-to-conductor clearances. 3. Access to facilities must be maintained at all times. Street lights may be allowed in the fee, but in all cases must be reviewed by PG&E for proper clearance. Roads and utilities should cross the transmission easement	I	CD (E)

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		as nearly at right angles as possible. Road intersections will not be allowed within the transmission easement. Any roads dedicated for public purposes within PG&E's easements will require a Consent to Common Use Agreement (CCUA) with PG&E. 4. Any proposed landscaping within or near PG&E's transmission easements must comply with existing vegetation standards.		
89.		***SMUD Requirements*** 1. SMUD has existing overhead 69kV facilities along Prairie City Rd as well as within the project area that will need to remain. SMUD has existing overhead 12kV facilities on the project site that will need to remain. The Applicant shall be responsible for maintaining all CalOSHA and State of California Public Utilities Commission General Order No. 95 safety clearances during construction and upon building completion. If the required clearances cannot be maintained, the Applicant shall be responsible for the cost of relocation. 2. SMUD has existing underground 12kV facilities along Mangini Parkway that will need to remain. The Applicant shall be responsible for maintaining all CalOSHA and State of California Public Utilities Commission General Order No. 128 safety clearances during construction and upon building completion. If the required clearances cannot be maintained, the Applicant shall be responsible for the cost of relocation or removal. 3. Structural setbacks less than 14-feet shall require the Applicant to conduct a pre-engineering meeting with all utilities to ensure property clearances are maintained. 4. Any necessary future SMUD facilities located on the Applicant's property shall require a dedicated public utility easement. This will be determined prior to SMUD performing work on the Applicant's property. 5. In the event the Applicant requires the relocation or removal of existing SMUD facilities on or adjacent to the subject property, the Applicant	G, I, B, O	CD (E)

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		shall coordinate with SMUD. The Applicant shall be responsible for the cost of relocation or removal. 6. SMUD reserves the right to use any portion of its easements on or adjacent to the subject property that it reasonably needs and shall not be responsible for any damages to the developed property within said easement that unreasonably interferes with those needs. 7. The Applicant shall not place any building foundations within 5-feet of any SMUD trench to maintain adequate trench integrity. The Applicant shall verify specific clearance requirements for other utilities (e.g., Gas, Telephone, etc.). 8. In the event the City requires an Irrevocable Offer of Dedication (IOD) for future roadway improvements, the Applicant shall dedicate a 12.5-foot public utility easement (PUE) for overhead and/or underground facilities and appurtenances adjacent to the City's IOD. 9. The Applicant shall comply with SMUD siting requirements (e.g., panel size/location, clearances from SMUD equipment, transformer location, service conductors). Information regarding SMUD siting requirements can be found at: https://www.smud.org/en/Business-Solutions-and-Rebates/Design-and-Construction-Services 10. The Applicant shall provide separate SMUD service points to each parcel to the satisfaction of SMUD. 11. The Applicant shall locate, verify, and provide a drawing to SMUD identifying all electrical utility infrastructure for the existing structures. If necessary, any existing onsite electrical infrastructure that serves existing structures shall be relocated to the satisfaction of SMUD. 12. The Applicant shall dedicate a 12.5-foot public utility easement for overhead and/or underground facilities and appurtenances adjacent to all public street rights-of-ways. 13. The Applicant shall dedicate any private drive, ingress and egress easement, (and 10-feet adjacent thereto) as a public utility easement for		

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		(overhead and) underground facilities and appurtenances. All access roads shall meet minimum SMUD requirements for access roads. 14. The Applicant shall dedicate Lettered lots, Landscape Corridors and common areas as a public utility easement for (overhead and) underground facilities and appurtenances, except for those areas where structures or pools are located. 15. The Applicant shall dedicate and provide all-weather vehicular access for service vehicles that are up to 26,000 pounds. At a minimum: (a) the drivable surface shall be 20-feet wide; and (b) all SMUD underground equipment and appurtenances shall be within 15-feet from the drivable surface. 16. The Applicant shall identify SMUD's transmission line easement as a "Restricted Building and Use Area" on the subject map. 17. SMUD occupies a transmission line easement within the boundaries of the subject map and certain uses are not permitted or compatible with the safety, operation, maintenance and construction of our transmission line facilities. If the Applicant proposes any use within the transmission line easement, the Applicant shall route its plans to SMUD for review. For more information regarding transmission encroachment, please visit: https://www.smud.org/en/do-business-with-smud/real-estate-services/transmission-right-of-way.htm. 18. Prior to the issuance of any grading or building permits, the Applicant or its designee shall obtain a joint-use agreement from SMUD consenting to proposed development within SMUD's transmission line easement. Please contact SMUD's Property Administrator for application procedures. The Contractor shall provide SMUD with a schedule of work (with dates and times) for any excavation within ten feet of the transmission line(s). 19. Applicant will include phasing of development and order of planned construction upon submitting a new service application to SMUD for the		

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		initial subdivision phase(s) and/or road improvement backbone project(s). 20. Development phases submitted for new service should include all lots fronting streets.		
UTILITIES DEPARTMENT REQUIREMENTS				
90.		***Water Conservation*** To ensure compliance with State nonfunctional turf regulations, all landscape plans and projects shall be designed, installed, and maintained in full accordance with Assembly Bill 1572, as codified in California Water Code Section 10608.14. This includes all requirements related to nonfunctional turf, water-efficient landscape design, and irrigation.	O	UD

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
91.		***Water Infrastructure Requirements – On Site*** 1. All water infrastructure within I-courts are to be privately owned, operated and maintained 2. All water meters shall be "banked" in the landscape area at the beginning of each I-court. Applicant shall confirm there is sufficient room between wet utilities and dry utilities to bank the water meters associated with each I-court 3. If the City is approving privately maintained streets within PUEs in the private roads of Village 8 and 9, the City will own, operate and maintain the water system up to the water meters as defined and described in the City's Municipal Code, Design Standards, Construction Specifications and Construction Drawings (with the exception of any and all I-courts). 4. Any new water tie-in to an existing main must be a cut-in tee with 3 valves. Hot taps are not allowed. 5. 3 valves shall be installed at every tee and 4 valves shall be installed at every cross. 6. This project will require 3 water sampling stations to be installed in the various subdivisions during the development of the improvement plans. These shall be reviewed and approved by the Utilities Department. 7. Water services and meters shall not be installed in driveways and must be installed in landscape areas. 8. School sites are required to have a looped fire system with RPPA devices.	I, OG	UD
92.		***Construction Water*** Construction water for the Toll Brothers at Alder Creek project shall come from either the Zone 2 water system north of Highway 50 or from another source south of Highway 50 acceptable to the Department of Utilities. *The Utilities Department will monitor operations at the Foothills Pump Station to verify that the pump station will not operate more than 18 hours per day during the days when construction water is being used in the Plan Area. If the Foothills Pump*	I, B	UD

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		Station begins to operate 18 hours or more per day the Utilities Department reserves the right to limit or turn off construction water in the Plan Area until the pump operations no longer exceed 18 hours per day.		
93.		***Water Infrastructure Requirements - Backbone*** The following South of 50 FPA Phase 2 Improvements to the City's water system are required to be constructed and in-service as detailed below: 1. The FPA Zone 3 booster pump station at the City water treatment plant shall be built and operational at the first Certificate of Occupancy issued for the Toll Brothers at Alder Creek Project. 2. One of the two required FPA Zone 3 tanks shall be built and operational at the 276th residential building permit issued for projects within the Zone 3 service area in the FPA that carry this Condition on their entitlements. 3. The FPA Zone 4 pump station, pipeline and tank shall be built and operational by 6,500 occupied units within the FPA or 4.4 million gallons a day (MGD) of peak service need is reached, whichever comes first. In the event of conflict between this condition and what is identified in the Conceptual Folsom Plan Area Backbone Infrastructure Phasing Plan that accompanied the staff report, this condition shall control.	O, B	UD
94.		***Wastewater Infrastructure Requirements – On Site*** 1. All wastewater infrastructure within I-courts are to be privately owned, operated and maintained. 2. If the City is approving private road maintained streets within PUEs in the private roads of Village 8 and 9, the City will own, operate and maintain the wastewater system and the lower sewer lateral as defined and described in the City's Municipal Code, Design Standards, Construction Specifications and Construction Drawings (with the exception of any and all I-courts). 3. A sanitary sewer manhole shall be placed at the entrance to each I-court to differentiate public and private ownership.	I	UD

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		4. The 8" SS easement alignment associated with Court 13 within Village 8 near Lot L that terminated within Oak Avenue Parkway needs to be realigned to minimize 90 degree turn and minimize SSMH infrastructure. 5. The invert of the last sewer pipe segment associated with each neighborhood that ties into the 24" sewer trunk line along Oak Avenue, Alder Creek Parkway, or at other locations shall be designed in such a way that the invert of the 8" sewer line shall not be lower than the crown of the 24" trunk sewer line. Additionally, no inside drops to the 24" trunk line are allowed. The design engineer must detail each trunk sewer manhole to show how the flow will transition from the 8-inch sewer into the 24" trunk line and will not deposit solids onto the bench of the SSMH. The same requirements identified for the 24" trunk sewer line apply for any connection to a 15" trunk sewer line.		
95.		***Sewer Flow Metering*** *The applicant/owner of this project shall be required to design, build, and construct the following items associated with permanent sewer flow monitoring at two (2) locations described below as a part of the Toll Brothers at Alder Creek Project:* 1. Applicant/owner shall be required to provide a 100-amp full service electrical pedestal that will be required to meet the following criteria: a. Incorporates the 100-amp full service electrical pedestal on the civil improvement plans to the satisfaction of SMUD that adequately accommodates the power requirement for the area-velocity flow meter and associated appurtenances. b. Must be green tagged and is "ready" to accept a SMUD meter	I	UD

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		2. Applicant/owner shall be required to run conduit from the 100-amp electrical pedestal to 5-feet outside of the service pedestal location and terminate the conduit in a 17"x30" pull box. 3. Applicant/owner shall install one (1) 4" conduit from the proposed Flow Meter/PLC cabinet location to the through and through Sanitary Sewer Manhole (SSMH) Identified.		
96.		***Recycled Water*** There are parcels identified within the Toll Brother's Alder Creek Project that are designated as needing a Non-Potable recycled water service. Applicant shall request the Non-Potable Water Service Map from the City's Utilities Department prior to the applicant identifying how non-potable recycled water infrastructure will be designed and constructed for any lots within the proposed project that require non-potable recycled water.	I, M	UD
97.		***Low Impact Development*** This project is required to comply with the Sacramento Stormwater Quality Partnership's Stormwater Quality Design Manual. The project will need to demonstrate compliance with respect to hydromodification management, peak flow attenuation, low impact development (LID) controls and treatment controls including full trash capture control. A Drainage Report shall be submitted with Improvement Plans.	I, M	CD (E), PW
98.	✓	***Stormwater Management Best Management Practices*** The storm drain improvement plans shall provide for "Best Management Practices" that meet the requirements of the water quality standards of the City's National Pollutant Discharge Elimination System Permit issued by the State Regional Water Quality Control Board. In addition to compliance with City ordinances, the owner/applicant shall prepare a Stormwater Pollution Prevention Plan (SWPPP), and implement Best	I, OG	CD (E), PW

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		Management Practices (BMPs) that comply with the General Construction Stormwater Permit from the Central Valley RWQCB, to reduce water quality effects during construction. Detailed information about the SWPPP and BMPs are provided in Chapter 3A.9, "Hydrology and Water Quality." Each proposed project development shall result in no net change to peak flows into Alder Creek and associated tributaries, or to Buffalo Creek, Carson Creek, and Coyote Creek. The owner/applicant shall establish a baseline of conditions for drainage on-site. The baseline-flow conditions shall be established for 2-, 5-, and 100-year storm events. These baseline conditions shall be used to develop monitoring standards for the stormwater system on the Specific Plan Area. The baseline conditions, monitoring standards, and a monitoring program shall be submitted to USACE and the City for their approval. Water quality and detention basins shall be designed and constructed to ensure that the performance standards, which are described in Chapter 3A.9, "Hydrology and Water Quality," are met and shall be designed as off-stream detention basins. Discharge sites into Alder Creek and associated tributaries, as well as tributaries to Carson Creek, Coyote Creek, and Buffalo Creek, shall be monitored to ensure that pre-project conditions are being met. Corrective measures shall be implemented as necessary. The mitigation measures will be satisfied when the monitoring standards are met for 5 consecutive years without undertaking corrective measures to meet the performance standard. The storm drainage design shall provide for no net increase in run-off under post-development conditions.		
99.		***Litter Control*** During Construction, the owner/applicant shall be responsible for litter control and sweeping of all paved surfaces in accordance with City standards. All on-	OG	CD(E)

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		site storm drains shall be cleaned immediately before the commencement of the rainy season (October 15).		
100.		***Offsite Drainage/Hydro-Modification Basins*** The project proposes three off-site stormwater basins: Combination Basin No. 1, Detention Basin No. 1, and Hydro-Modification Basin No. 14. Detention Basin No. 1, and Hydro-Modification Basin No. 14 are both located on the Area 40 Superfund site and may require lining or other improvements to restrict infiltration. Owner/applicant shall coordinate with the City Engineer on any changes to proposed designs. In addition, the applicant acknowledges that infrastructure improvements in Area 40 are dependent on the completion of environmental remediation work to the satisfaction of the U.S. Environmental Protection Agency, and that this may delay development of project components dependent on the infrastructure.	I	CD (E)
WASTE MANAGEMENT AND RECYCLING				
101.		***Trash and Recycling Collection Plan*** A final Collection Plan shall be submitted to City Solid Waste and Recycling for review and approval that encompasses the following: • A site plan detailing proposed collection locations for all totes. The plan shall show multiples of three cans per collection location, and denote which areas are reserved for which addresses. • A site plan detailing the location and verbiage of signs restricting parking on service days. • CC&R language describing storage requirements for trash, organic waste, and recycling totes, time frames for setting totes out for collection and for their return to storage, and prohibitions against setting totes in prohibited locations for collection. Occupancy of residential units shall not be granted until approval of the Collection Plan is obtained.	B, O	PW

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
SPECIAL DISTRICT REQUIREMENTS				
102.		***Folsom Cordova Unified School District Requirements*** 1. Based on the central location of the site to the surrounding subdivision, this should be an easily accessible site to students. Proper care should be taken to provide safe sidewalks, crosswalks and bike lanes to the site from all directions. This is especially the case with the major collector Oak Avenue on the west side of the site to allow safe student crossing from the development on the eastern side of Oak Avenue. 2. The street sections for the school parcel are still showing a 4-foot-wide sidewalk. If the sidewalks on the school parcel are constructed by the developer, the ones fronting the school must be wider than 4 feet. 3. Work with District staff to ensure that street sections surrounding the elementary school site are sufficient width to accommodate parking and school bus circulation and drop off. Street sections may need to be wider than the standard sections shown in the Specific Plan for Minor Residential Streets. 4. Continue to coordinate with District staff to locate and size utility stubs to the school site.	I	CD (E)
103.		***SacSewer Conditions*** 1. The Project proponent must prepare a sewer study and submit it to SacSewer for review and approval. The sewer study includes connection points and phasing information to assess the Project's buildout capacity impacts on the SacSewer interceptor system. 2. SacSewer will require a portion of land within Lot O (APN: 072-3190-037) to be reserved for a future SacSewer pump station or improvements to the City's existing Easton Valley Parkway pump station. The reserved land is to be adjacent to the City's existing Easton Valley Pump Station within APN: 072-3190-038, and be a minimum of 120 x 120 sq. ft. (0.33 acres). Easements for future SacSewer	I	CD (E)(P)

Cond. #	Mitigation Measure	Condition of Approval	When Required	Responsible Department
		interceptor facilities will also be required. Close coordination between the City, SacSewer, and the Project Proponent will be needed to ensure that the future sewer needs for the FPASP are being planned and designed accordingly. 3. SacSewer's Iron Point pump station (N40) shows Peak Wet Weather Flows (PWWF) caused by significant inflow and infiltration (I/I) within the City's upstream collection system, which are significantly higher than the design contemplated. During storm events in the last couple of years, N40 was at, or near, its design capacity. Most of the I/I originates from the older part of the City north of Highway 50; however, SacSewer can't confirm the extent without accurate flow data from the City's flow meter at Iron Point Road. Without reducing I/I within the N40 shed, the Project proponent must construct projects with improvements to store and meter flow into the City's collection system. It is recommended that the City's Department of Utilities continue to work with SacSewer to address the I/I within the N40 service area. Before the ISSUANCE OF A BUILDING PERMIT: The owner must contact SacSewer Development Services at PermitServices@sacsewer.com or by phone at (916) 876-6100 to determine if SacSewer impact fees are due. Fees must be paid before the issuance of building permits.		
104.		***SacSewer Advisories*** 1. The City of Folsom (City) is responsible for providing local sewer service to the proposed Project site via its local sanitary sewer collection system. SacSewer is responsible for conveying sewage from the City collection system to the EchoWater Resource Recovery Facility for treatment, resource recovery, and disposal.	I	CD (E)(P)

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		2. The City will provide interim sewer service to the FPASP for the initial flow generation until the sewer flows generated within the FPASP reach the necessary SacSewer design velocities, prompting SacSewer to construct the necessary infrastructure for the estimated ultimate buildout flows.		
		MISCELLANEOUS REQUIREMENTS		
105.		***Noise Requirements (Construction and Operational)*** Compliance with Noise Control Ordinance and General Plan Noise Element shall be required. Hours of construction operation shall be limited from 7:00 a.m. to 6:00 p.m. on weekdays and 8:00 a.m. to 5:00 p.m. on Saturdays. No construction is permitted on Sundays or holidays. Construction equipment shall be muffled and shrouded to minimize noise levels.	I, B	CD (P)(E)
106.		***Advisory Condition: Class IV Bike Lane on Oak Avenue Parkway*** If the owner/applicant chooses to design and construct Class IV bike lanes on Oak Avenue Parkway from Mangini Parkway in the south to Alder Creek Parkway in the north, the Class IV bike lanes shall be designed to include a 3-foot buffer with one direction flexible posts on each side of the street. The center median may be reduced from 16-feet to 14-feet and the open space buffer/landscape lot, may reduce down from 30 feet to 29 feet to accommodate the bike lane buffer without expanding the overall width of the section. The final design should be based on Figure 4 (No Parking – Separated Bikeway on Street) of the Caltrans Design Information Bulletin 89-02 to the satisfaction of the City Engineer. Regardless of whether owner/applicant designs or constructs the Class IV bike lanes or not each roadway section left or right of the median must be a minimum of 20 feet from face of curb at curb and gutter to face of curb at median.	I	CD (P)(E), PW
107.		***Advisory Condition: Minor Administrative Modification for Oak Avenue Parkway*** In the event that owner/applicant choses to construct a Class IV bike lanes on Oak Avenue Parkway, a Minor Administrative Modification (MAM) for Oak	I	CD (P)(E), PW

CONDITIONS OF APPROVAL FOR THE TOLL BROTHERS AT ALDER CREEK PROJECT (MSTR25-00084) SOUTH OF ALDER CREEK PARKWAY, EAST AND WEST OF OAK AVENUE PARKWAY, NORTH OF MANGINI PARKWAY SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP, PLANNED DEVELOPMENT PERMIT, INCLUSIONARY HOUSING PLAN, AND MINOR ADMINISTRATIVE MODIFICATION				
Cond. #	**Mitigation Measure**	**Condition of Approval**	**When Required**	**Responsible Department**
		Avenue Parkway shall be prepared and approved by City staff to modify the Oak Avenue Parkway cross section to include a Class IV bike lane on each side consistent with the standards set forth in Figure 4 of Caltrans Design Information Bulletin 89-02.		

CONDITIONS APPLICABILITY LEGEND

RESPONSIBLE DEPARTMENT		**WHEN REQUIRED**	
CD (P) (E) (B) (A)	Community Development Department Planning Division Engineering Division Building Division City Arborist/Urban Forester	I	Prior to approval of Improvement Plans
		M	Prior to approval of Final Map
		B	Prior to issuance of first Building Permit
		O	Prior to approval of Occupancy Permit
		G	Prior to issuance of Grading Permit
PW	Public Works Department	DC	During construction
PR	Park and Recreation Department	OG	On-going requirement
PD	Police Department		
FD	Fire Department		
UD	Utilities Department		

Attachment 2

Planning Commission Staff Report without Attachments, dated May 20, 2026,

AGENDA ITEM NO. 2
Type: Public Hearing
Date: May 20, 2026

Planning Commission Staff Report

50 Natoma Street, Council Chambers
Folsom, CA 95630

Project:	Toll Brothers at Alder Creek
File #:	MSTR25-00084
Request:	Small Lot Vesting Tentative Subdivision Map, Planned Development Permit, Inclusionary Housing Plan, Minor Administrative Modification, and Determination that the project is Exempt Under CEQA
Location:	Approximately 464.2 acres south of Alder Creek Parkway, east and west of Oak Avenue Parkway, north of Mangini Parkway, and east of Prairie City Road, in the Folsom Plan Area Specific Plan (APNs 072-0060-093, 072-0060-007, 072-3190-037 (partial), 072-0060-098 (partial) and 072-0060-102 (partial)
Staff Contact:	Jessica Brandt, Principal Planner, 916-461-6207, jbrandt@folsom.ca.us

Property Owner
Alder Creek West Improvement Company, LLC
4370 Town Center Blvd.
El Dorado Hills, CA 95762
Contact: Bill Bunce

Applicant
Toll Brothers
110 Woodmere Rd., Suite 120
Folsom, CA 95630
Contact: Martin Nivinski

Recommendation: Conduct a public hearing and upon conclusion recommend that the City Council confirm staff's determination that the Toll Brothers at Alder Creek project is exempt from CEQA pursuant to CEQA Guidelines Section 15182 and recommend approval of a Small-Lot Vesting Tentative Subdivision Map, Planned Development Permit, Inclusionary Housing Plan, and Minor Administrative Modification for development of the Toll Brothers at Alder Creek project (MSTR25-00084), based on the findings included in the staff report (Findings A-BB) and conditions of approval (Conditions 1-105) attached to the staff report.

Project Summary: The proposed project involves several related actions associated with a proposed residential development:

- A **Small Lot Vesting Tentative Subdivision Map** to create 1,424 residential lots in 18 Villages over an area of approximately 464.2 acres. Additional parcels are also included for private recreation, park, landscaping, open space, roadway, fire

station, and elementary school use. In total, 1,497 lots will be created.

- A **Planned Development Permit** to establish unique development standards for the project, and to review landscape theming and design and preliminary homesite design guidelines and architectural themes.
- An **Inclusionary Housing Plan** to pay in-lieu fees to meet the project's affordable housing needs.
- A **Minor Administrative Modification** to adjust boundaries between Specific Plan land use designations to accommodate more efficient use of land within the project boundary and adopt an alternative roadway cross section for Alder Creek Parkway.

These proposed actions are described in detail and analyzed later in this report.

The proposed project would be located on approximately 464.2 gross acres in the western area of the Folsom Plan Area Specific Plan (FPASP or Plan Area). The project area includes FPASP residential land use designations of Single Family (SF), Single Family High Density (SFHD), and Multi-Family Low Density (MLD), and non-residential land use designations of Park (P), Public/Quasi Public (PQP), and Open Space (OS). Residential development would be a mix of traditional single-family homes, "duet" half-plex homes, and 4-pack and 6-pack cluster homes. Final hearing body is the City Council.

Environmental Review: The proposed project implements and is consistent with the Folsom Plan Area Specific Plan and its supporting Environmental Impact Report/Environmental Impact Statement (EIR/EIS), and none of the factors set forth in CEQA Guidelines Section 15162 (Subsequent EIRs and Negative Declarations) are present or have been identified, pursuant to CEQA Guidelines Section 15182 (Projects Pursuant to a Specific Plan). Therefore, the city finds that the project is exempt from further CEQA compliance. The city further finds that the project is also exempt pursuant to Government Code Section 65457 related to specific plans.

CITY OF
FOLSOM
DISTINCTIVE BY NATURE

AGENDA ITEM NO. 2
Type: Public Hearing
Date: May 20, 2026

Attachments:

1. Description/Analysis/Findings
2. Background
3. Conditions of Approval
4. Vicinity Map
5. Small Lot Vesting Tentative Subdivision Map, dated May 13, 2026, 2026
6. Preliminary Grading & Storm Drain Plan, dated May 13, 2026
7. Preliminary Sanitary Sewer, Recycled Water & Domestic Water Plan, dated May 13, 2026
8. Illustrative Master Plan Exhibit, dated March 4, 2026
9. Perimeter Wall and Fence Exhibit, dated November 6, 2025
10. Toll Brothers at Alder Creek Architectural Design Guidelines
11. Toll Brothers at Alder Creek Landscape Design Guidelines
12. Retaining Walls Exhibit, dated March 2026
13. Solid Waste Management Cart Location Exhibit, dated June 2025
14. Toll Brothers at Alder Creek Final Map Preliminary Phasing Exhibit, dated May 6, 2026
15. Folsom Plan Area Conceptual Backbone Infrastructure Phasing Plan, dated May 2026
16. Minor Administrative Modification Exhibits, dated April 7, 2025
17. Street Name List, Final, dated March 17, 2026
18. Inclusionary Housing Plan Letter, dated April 15, 2026
19. Project Narrative, dated April 2026
20. Alder Creek Conformity Analysis with Appendices, date November 19, 2025
21. Kimley Horne Traffic Report and Circulation Study, dated April 1, 2025
22. Arborist Report, dated April 2025
23. Folsom Plan Area Oak Woodlands Exhibit, dated March 11, 2026
24. Public Comments Received

AGENDA ITEM NO. 2
Type: Public Hearing
Date: May 20, 2026

Submitted,

_____
PAM JOHNS
Community Development Director

ATTACHMENT 1
DESCRIPTION/ANALYSIS/FINDINGS

APPLICANT'S PROPOSAL

Project Overview

The Toll Brothers at Alder Creek project (Project) consists of a Small Lot Vesting Tentative Subdivision Map, Planned Development Permit, Inclusionary Housing Plan, and Minor Administrative Modification to support development of 1,424 single family dwelling units with varying densities covering 464.2 acres. A variety of other parcels are also included for land uses such as private recreation, parks, landscaping, open space, roadways, a fire station, and an elementary school. In total, 1,497 total lots will be created.

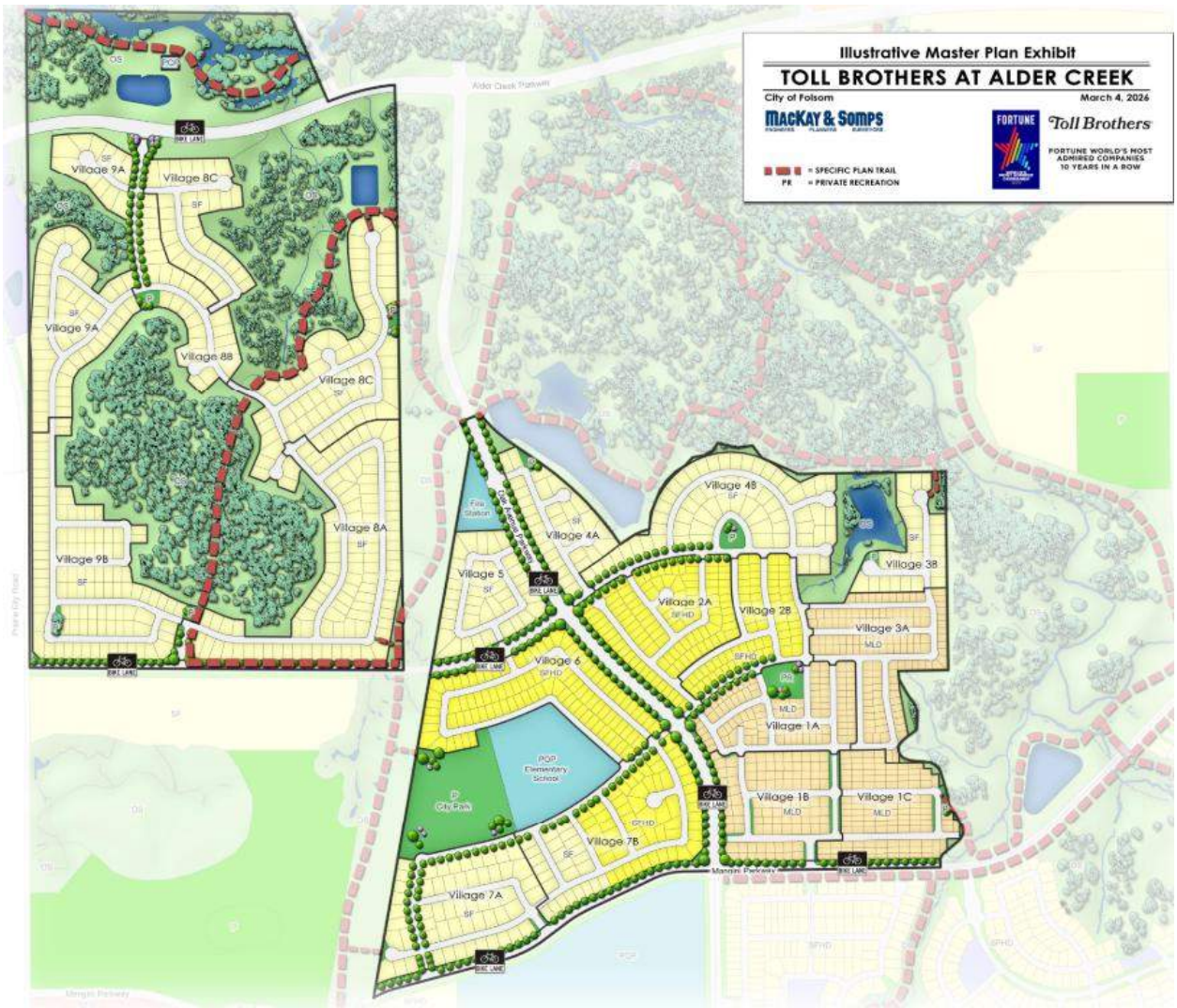
The Project is in the western area of the Folsom Plan Area Specific Plan (FPASP or Plan Area). The FPASP, approved in 2011, covers over 3,500 acres of previously undeveloped land located south of Highway 50, north of White Rock Road, east of Prairie City Road, and adjacent to the Sacramento County/El Dorado County line in the southeastern portion of the City of Folsom. See Attachment 2 (Background) of this report for further information on the Plan Area. Figure 1 below is an aerial of the project site. Attachment 4 (Vicinity Map) provides the project location in context with the Plan Area.

FIGURE 1: LOCATION MAP

The project site consists of undeveloped rolling terrain that includes annual grassland and oak woodland tree and plant communities. Surrounding properties are similarly undeveloped, though all property east of Prairie City Road is within the Plan Area and projected for a range of uses from Open Space to High Density Multifamily consistent with the FPASP. Currently, the project site can be accessed from Mangini Parkway, north of the Toll Brothers Regency subdivision.

The Project is primarily a residential development. However, it includes multiple parcels that are designated for open space, parkland, school, and fire services. Private mini-parks and a private community recreation facility are also proposed. The applicant has created an overall land plan that includes these additional land uses, which is shown in Figure 2 and included with this report as Attachment 8.

FIGURE 2: ILLUSTRATIVE MASTER PLAN EXHIBIT

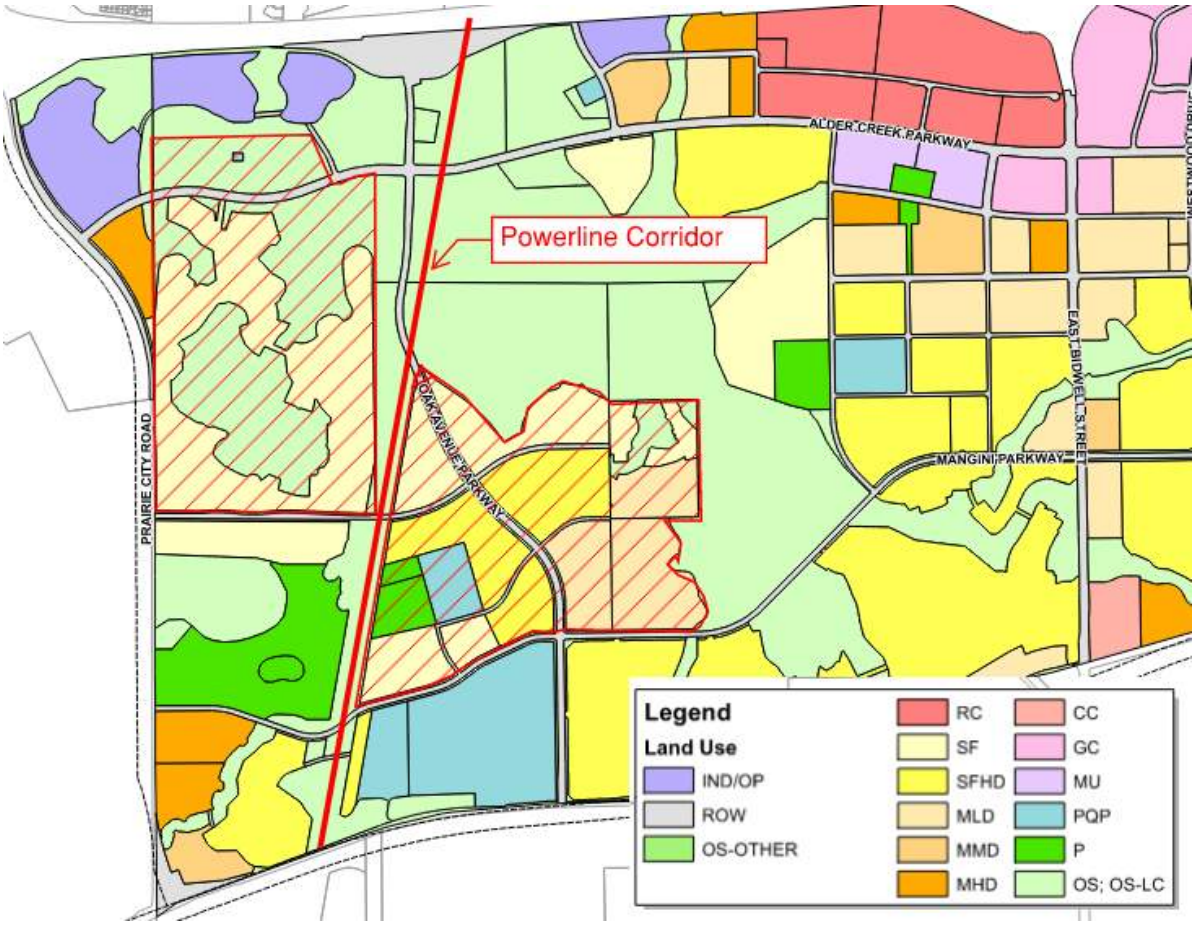


The Project proposes land uses that are consistent with the Plan Area Land Use Designations for the subject site. Minor changes to boundaries between Land Use Designations are also proposed to make the overall land plan more functional. Land uses proposed include low- and medium-density traditional single-family residential lots in the SF (Single Family) and SFHD (Single Family High Density) Designations and residential half plex (called 'Duets') and small-lot single family residential organized into four-pack and six-pack configurations around shared private drives on land designated for Multi-Family Low Density (MLD) development. One proposed parcel within the SF land use designation is proposed to contain a fire station, which is allowed in that designation.

Areas designated OS (Open Space) would be deeded to the city to remain natural open space with passive recreation uses including trails and preserved wetland, ponds, and other water features. One parcel is designated P (Park) and will be deeded to the city as a Neighborhood Park. Finally, adjacent to the park site is an anticipated elementary school site designated PQP (Public Quasi-Public), which would be deeded to the Folsom-Cordova Unified School District.

The red hatched area in Figure 3 shows a portion of the Plan Area Land Use Plan (Figure 4.2 of the Specific Plan) with the parcels included as part of this project proposal and their Designations.

FIGURE 3: PROJECT AREA LAND USE



The applicant anticipates developing the Project in three main phases, which they describe as follows:

- Phase 1: Area west of Oak Avenue Parkway, east of the Powerline Corridor. (Note that while this area includes the Neighborhood Park and Elementary School sites, the applicant does not have control over timing of development for those facilities other than granting the land to the city and Folsom-Cordova School District, respectively.)
- Phase 2: Area east of Oak Avenue Parkway.
- Phase 3: Area west of the Powerline Corridor.

Small Lot Vesting Tentative Subdivision Map

The applicant has submitted a Small-Lot Vesting Tentative Subdivision Map to create a total of 1,424 residential lots with varying densities. As opposed to a traditional tentative subdivision map, a vesting tentative map locks in the development rules—such as zoning standards, density, design requirements, and improvement obligations—that are in effect at the time of approval. The applicant states that they have designed the map to

accommodate a variety of housing types and price points. There are twelve different residential lot sizes. These are shown in Table 1 below, along with the land use designation in which they will be developed and their net density.

TABLE 1: PROPOSED PROJECT LOTTING - RESIDENTIAL

Lot Type	Zoning Designation	Typical Lot Size	Gross Acres	Dwelling Units	Net Density
1A	MLD	42' x 65' Duets	12.8	104	9.3
1B	MLD	4-Pack	12.8	101	8.2
1C	MLD	6-Pack	11.6	124	11.0
2A	SFHD	47' x 85'	15.2	106	7.0
2B	SFHD	47' x 75'	10.2	71	7.0
3A	MLD	45' x 65'	14.2	132	9.4
3B	MLD	70' x 110'	6.5	25	3.9
4A	SF	65' x 105'	8.5	31	3.9
4B	SF	70' x 110'	19.2	63	3.7
5	SF	65' x 105'	9.9	38	3.9
6	SFHD	50' x 100'	16.5	99	6.0
7A	SF	75' x 110'	17.0	56	3.5
7B	SFHD/SF	60' x 110' and 75' x 100'	19.0	83	4.3
8A	SF	60' x 105' and 65' x 105'	24.9	104	4.3
8B	SF	70' x 100'	9.7	27	3.0
8C	SF	75' x 100'	29.3	96	3.3
9A	SF	70' x 110'	17.7	62	3.5
9B	SF	60' x 105'	21.5	102	4.9

The Project also includes non-residential lots, with Table 2 below showing the breakout of land use types by number of lots and acreage.

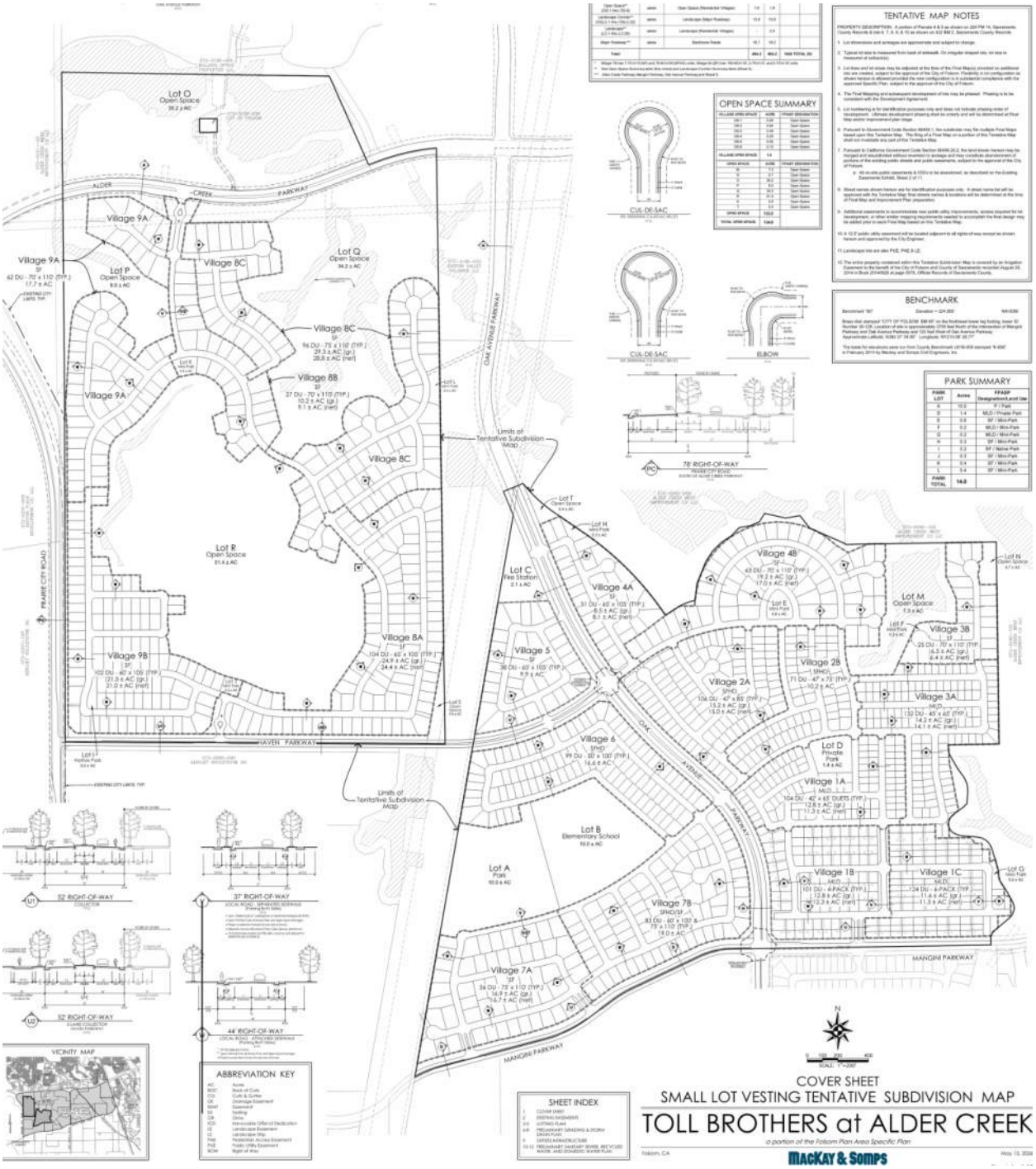
TABLE 2: PROPOSED PROJECT LOTTING – LAND USES

Land Use	Number of Lots	Acreage
Residential	1,424	270.4
Open Space (Public and Private)	14	134.6
Park – Public	1	10
Park - Private	9	4
Open Space/Landscape Corridor (OS/LC) Lots	22	13.2
Landscape (LC) Lots	25	2.6
Fire Station	1	2.1

Elementary School	1	10.0
Major roadway acreage estimate		17.3
Total	**1,497**	**464.2**

The proposed Small-Lot Vesting Tentative Subdivision Map is shown in Figure 4 on the following page. Attachment 5 to this report is the full set of Small-Lot Vesting Tentative Subdivision Map exhibits. The applicant is also requesting approval of Preliminary Grading and Storm Drain Plans and Preliminary Sanitary Sewer, Recycled Water & Domestic Water Plans (Attachments 6 and 7). These preliminary plans were provided to the Public Works and Utilities Departments and the Development Engineering Manager for review as part of the entitlement vetting process. Each reviewer has provided conditions related to required subsequent permitting and review in each technical area, as required by the Subdivision Map Act and FMC Chapter 16.16.

FIGURE 4: SMALL LOT VESTING TENTATIVE SUBDIVISION MAP



Planned Development Permit

To allow greater flexibility in the design of integrated developments than otherwise possible through strict application of Specific Plan development standards certain Plan Area parcels are included in a Planned Development District (PD) per the criteria outlined in Folsom Municipal Code (FMC) Chapter 17.38. All parcels that are proposed for residential development as part of this Project are within a PD District. The PD District overlay requires that development applications include a request for a PD Permit. Therefore, the applicant is required to request a Planned Development Permit (PD Permit). A PD Permit can also be the vehicle to request project-level design review in lieu of a separate Design Review entitlement.

The applicant is requesting that the PD Permit include the following:

- Confirmation of the project's compliance with FPASP development standards.
- Consideration of a limited number of development standard deviations allowing smaller minimum lot sizes for medium-density single-family residential and greater flexibility in the design of the small-lot single-family residential products.
- Approval of project-level architectural and landscape design guidelines to serve as the framework for subsequent Design Review requests.

Development Standards

Overall, the applicant proposes to develop in compliance with Plan Area development standards applicable to traditional single-family product in the SF, SFHD, and MLD designation as well as duet product in the MLD zoning designations, except for reduced minimum lot sizes in the SFHD and MLD designations. The applicant states that the reduction in certain minimum lot sizes accommodates the unique parcel shapes within the project area, while maintaining consistency with the intent and net density designations established in the Folsom Plan Area Specific Plan.

- Lots in the SF land use designation will range from 6,300 square feet (sf) to 8,250 sf in size, with 15- to 20-foot front yard setbacks, 5-foot interior side yard setbacks, and 20-foot rear-yard setbacks. Maximum building coverage is 45% and maximum building height is 35 feet.
- Lots in the SFHD land use designation will range from 3,525 sf to 6,600 sf, with 12.5- to 15-foot front yard setbacks, 5-foot interior side yard setbacks, and 15-foot rear-yard setbacks. Maximum building coverage is 50% and maximum building height is 35 feet.
- Lots in the MLD designation developed as traditional single-family product will range from 2,925 sf to 7,700 sf, with 12.5- to 15-foot front yard setbacks, 5-foot interior side yard setbacks, and 10-foot rear-yard setbacks. Maximum building coverage is 50% and maximum building height is 35 feet.
- Lots in the MLD designation developed as duets (two attached dwelling units each

on their own lot) will be 2,730 sf, with 12.5- to 15-foot front yard setbacks, 5-foot interior side yard setbacks, and 20-foot rear-yard setbacks. Maximum building coverage is 50% and maximum building height is 35 feet.

Appendix "A" of the FPASP outlines the standards applicable to each land use designation and product type in Tables A.2, A.3, and A.4. The proposed development standards for the Project are included in Attachment 10 (Architectural Design Guidelines).

The applicant is proposing two sets of project-specific development standards for the small-lot single-family products (4-pack and 6-pack detached single-family) proposed in the MLD land use designation, also found in Attachment 10. The Plan Area does not include specific development standards for small-lot single-family residential product, so new and unique standards are necessary to accommodate this type of lotting pattern. In general, both the 4- and 6-pack lotting centers around a shared private drive, with smaller lot sizes and greater building coverages. Setbacks are also taken from either street frontage or the private drive (called the motor court) depending on the placement of the specific lot. Table 3 below outlines the proposed 4- and 6-pack small-lot single family residential development standards for the MLD land use designation. Figures 5 and 6 show each lotting pattern as a diagram.

TABLE 3: PROPOSED PROJECT-SPECIFIC DEVELOPMENT STANDARDS FOR SMALL-LOT SINGLE-FAMILY PRODUCT, MLD LAND USE DESIGNATION

Development Standard	4-Pack Product	6-Pack Product
Lot Size		
Motor Court Lot	3,000 square feet (sf) minimum (min)	2,800 sf min
Street Facing Lot	3,000 sf min	N/A
Building Coverage		
Motor Court Lot	60% maximum (max)	65% max
Street Facing Lot	60% max	N/A
Front Yard Setbacks		
To street garage	18 feet (ft) min	N/A
To motor court garage from property line	18 ft min	N/A
Front yard (street side)	10 ft min	N/A
Front yard (drive side)	2 ft min	5 ft min
Side yard (drive side)	2 ft min	4 ft min

Development Standard	4-Pack Product	6-Pack Product
Side yard (See Note)	0-5 ft min	0-5 ft min
Rear yard	8 ft min	5-10 ft min
Note: For zero-lot-line dwelling units: 0 feet side yard setback for one side, 10 feet side yard setback for the other side.		

FIGURE 5: 4-PACK LOTTING DIAGRAM

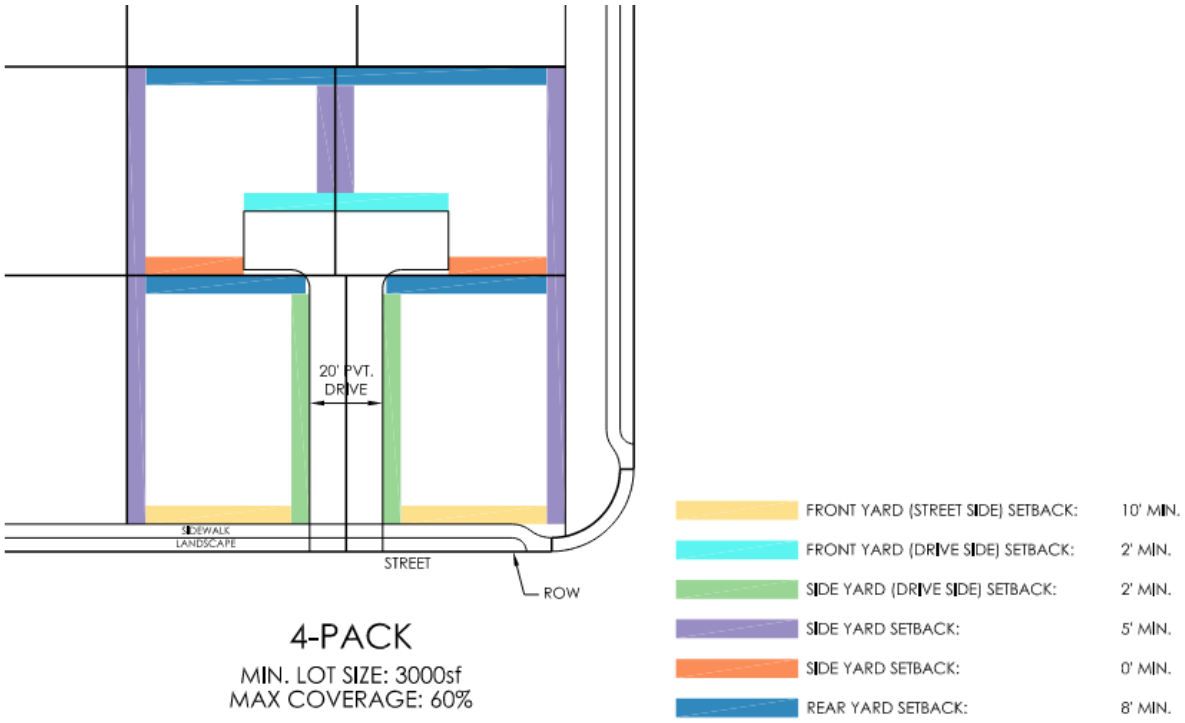
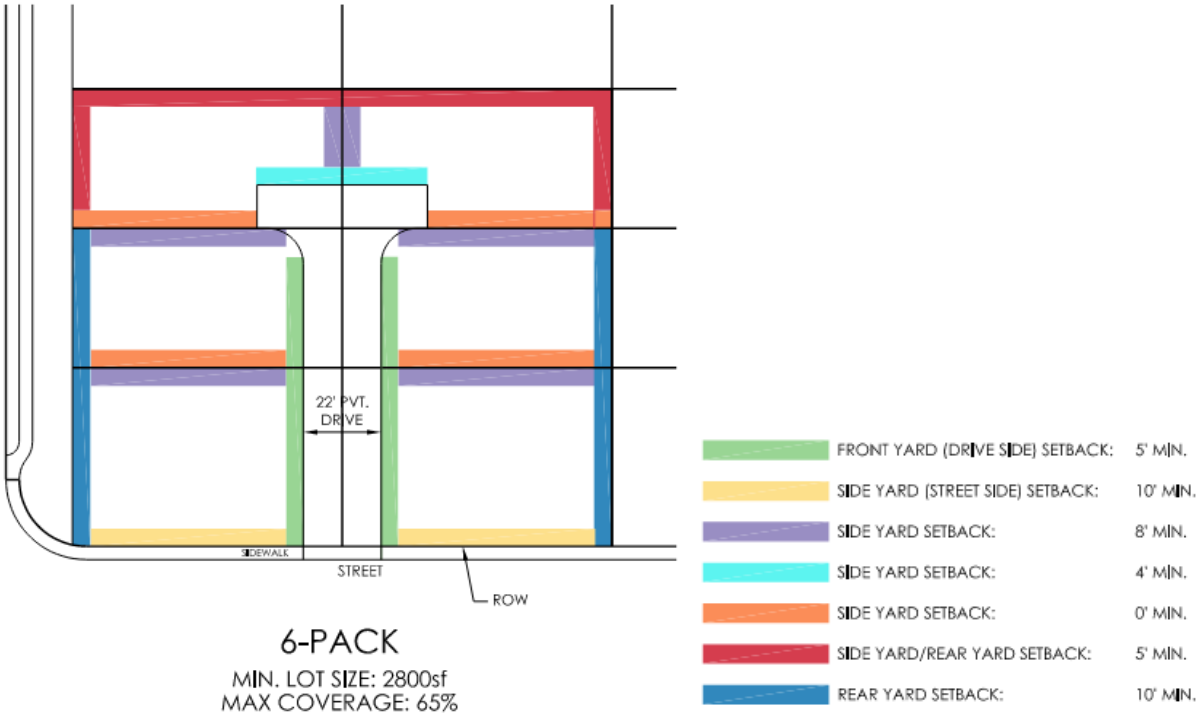


FIGURE 6: 6-PACK LOTTING DIAGRAM



The applicant states that the proposed 4-pack and 6-pack lotting patterns and related unit placement are employed throughout the country, including by the applicant, to create desirable and successful communities. They further state that these lot types meet the density requirements of the MLD zoning designation while introducing a more affordable detached single-family product to the market in a highly desirable area.

Architectural and Landscape Designs

The FPASP requires that all projects, including residential projects that are part of a tentative subdivision map, prepare design guidelines and either concurrently or subsequently obtain a Design Review approval. The city has permitted larger master planned residential projects to bring design guidelines through review as part of their PD Permit and return with lot- and unit-specific architectural and landscape designs. The applicant has opted for this approach and is providing a set of Architectural and Landscape Design Guidelines with the tentative subdivision map, with unit-specific design to follow under subsequent Design Review requests. These requests will likely be made per phase or portion of the subdivision being built at that time, with proposed specific architectural and landscape designs demonstrating compliance with the Architectural and Landscape Design Guidelines. The proposed Architectural Design Guidelines and Landscape Design Guidelines are included with this report as Attachments 10 and 11. Condition No. 71 requires that project-level Design Review be completed prior to building

permit issuance for any residential development that is part of this project.

The Architectural Design Guidelines include architectural themes, design objectives, architectural styles, and homesite examples. The applicant states that residential development in Toll Brothers at Alder Creek will incorporate a mix of architectural styles to promote visual diversity and interest. Architecture will respond to local climate and take its inspiration from the design trends of various periods throughout the City's history with a focus on incorporating more contemporary architectural forms and elevations to create timeless communities. Architectural styles selected for inclusion in the Guidelines include the following:

- Spanish Colonial and Contemporary
- Italian Villa
- Modern Craftsman, Farmhouse, Prairie, Spanish, Ranch, and Cottage
- Coastal Contemporary
- Western Farmhouse
- Prairie

Examples of the proposed architectural styles follow in Figure 7.

FIGURE 7: ARCHITECTURAL STYLE EXAMPLES

MODERN RANCH

SPANISH CONTEMPORARY

ITALIAN VILLA

MODERN PRAIRIE

MODERN SPANISH

The applicant has also provided a set of Landscape Design Guidelines that include the Project's landscape design vision, streetscape plan, master plant list, private amenity landscape designs, and plans for gated entry monumentation and site amenities. The applicant states that the landscape vision for the project is to work with the site's distinct natural topographical features and vegetation, historical ranch heritage, and rural character. The forms and materials of walls, fences, signs, structures, and paving will work with the native-focused master plant list to implement the design vision.

Figures 8 and 9 below show the preliminary plans included for a recreation/private park amenity proposed to serve the higher-density project area and the gated entry proposed for a low-density gated community in the western area of the project. The applicant also provided conceptual landscape plans for the 4- and 6-pack lotting patterns. Figure 10 shows the plan for the 6-pack product. Landscape plans for individual residential lots will be considered with subsequent Design Reviews and will be expected to be consistent with the Guidelines approved.

FIGURE 8: RECREATION FACILITY LANDSCAPE DESIGN

FIGURE 9: GATED ENTRY LANDSCAPE DESIGNS

FIGURE 10: 6-PACK PRODUCT CONCEPTUAL LANDSCAPE PLAN

The Project is adjacent to major roadways and open space areas. The applicant is proposing to install a split-face concrete block wall six feet in height along the project perimeter adjacent to the major roadways and Neighborhood Park 5. For project areas adjacent to open space areas, the applicant proposes open tube steel fencing six feet in height. Attachment 9 to this report shows the perimeter walls and Attachment 12 shows proposed retaining walls.

Private yard areas for the individual residential lots are proposed to be screened by a combination of wood fencing, open-view fencing, and masonry walls. The wood fencing will be utilized for the interior side yards, street side yards, and rear yards of the residential lots. The open-view fencing will be utilized for the rear yards on residential lots located adjacent to open space areas (where noise mitigation is not required). Masonry walls will be installed at various locations throughout the project site to minimize potential noise and privacy concerns.

Inclusionary Housing Plan

The FPASP and Section 17.104 of the FMC require all for-sale residential development projects consisting of 10 or more units to satisfy the city's inclusionary housing requirement. One option for satisfying the requirement is to pay a fee to the city in lieu of constructing the required number of inclusionary units for the development project. Consistent with the requirements of Section 17.104.060(F)(5) of the FMC, the applicant has submitted a signed letter stating that their intent is to pay the in-lieu fee for this project (Attachment 18).

Minor Administrative Modification

Per FPASP Section 13.3 (Administrative Procedures), Minor Administrative Modifications (MAMs) to Plan Area land use locations, parcel boundaries, and other amendments that are generally consistent with and do not substantially change the overall intent of the Plan Area, can be requested to support development projects. A MAM can be reviewed and approved by the Director of the Community Development Department. It can also be bundled with planning entitlements that require consideration by the City Council or Planning Commission if they support those requests. Such is the case for this project, where the applicant is requesting approval of a MAM to increase the number of FPASP Parcels (utilized to track residential unit allocations within the Plan Area) by dividing some larger parcels. The applicant also requests minor modifications to land use boundaries to reflect refined land planning around open space resources and the public park and school site. Finally, a reduced roadway cross section for Alder Creek Parkway is requested to reflect changes to expected transit services in the corridor. Exhibits to support the MAM request are included as Attachment 16 to this report.

ANALYSIS

The following sections provide an analysis of the Project:

A. General Plan and Specific Plan Land Use Consistency
B. Small-Lot Vesting Tentative Subdivision Map
C. Backbone Infrastructure
D. Traffic, Access, and Circulation
E. Oak Tree Preservation and Removal
F. Trails, Parks, Fire Station, and School Site
G. Planned Development Permit
H. Inclusionary Housing Plan
I. Minor Administrative Modification
J. Public Noticing
K. CEQA Review

A. General Plan and Specific Plan Land Use Consistency

Relevant Policies and Requirements

- *GP and SP OBJECTIVE H-1 (Housing).* To provide an adequate supply of suitable sites for the development of a range of housing types to meet the housing needs of all segments of the population.

- *GP and SP POLICY H-1.1.* The City shall ensure that sufficient land is designated and zoned in a range of residential densities to accommodate the City's regional share of housing.

The Project site has General Plan land use designations of SF (Single Family), SFHD (Single Family High Density), MLD (Multifamily Low Density), OS (Open Space), PQP (Public and Quasi-Public), and P (Parks). The FPASP adds a 'SP' (Specific Plan) prefix to these land use designations to denote the Specific Plan land use designations. The Project does not propose to amend either the General Plan or Specific Plan land use designations for the subject properties, other than minor adjustments requested under the MAM, and the Specific Plan land use designations are consistent with the General Plan designations. Table 4 below shows the land uses and densities (if applicable) proposed for each land use designation.

TABLE 4: LAND USE CONSISTENCY

Proposed Land Use	Land Use Designation	Allowed Use?	Permitted Density Range	Proposed Density Range	Density Consistent?
Traditional Single-Family Detached	SP-SF	Yes	1-4 units/acre	3-4.9 units/acre, average 3.7 units/acre	Yes
Traditional Single-Family Detached	SP-SFHD	Yes	4-7 units/acre	4.3-7 units/acre	Yes
Traditional Single-Family Detached	SP-MLD	Yes	7-12 units/acre	3.9-9.4 units/acre, average 7.6 units/acre	Yes
Small-Lot Single-Family Detached	SP-MLD	Yes	7-12 units/acre	8.2-11 units/acre	Yes
Two-Family (Duet)	SP-MLD	Yes	7-12 units/acre	9.3	Yes
Park	SP-P	Yes	N/A	N/A	N/A
School	SP-PQP	Yes	N/A	N/A	N/A
Open Space	SP-OS	Yes	N/A	N/A	N/A
Fire Station	SP-SF	Yes	N/A	N/A	N/A

Analysis

The city provides residential lands at a variety of residential densities as specified in the General Plan and in the Folsom Municipal Code. The Folsom Plan Area Specific Plan includes specialized zoning (Specific Plan Land Use Designations) that are customized to the Plan Area as adopted in 2011 and as amended over time. The FPASP provides residential lands at densities ranging from 1-4 dwelling unit per acre (SF), 4-7 dwelling units per acre (SFHD), 7-12 dwelling units per acre (MLD), 12-20 dwelling units per acre (MMD), 20-30 dwelling units per acre (MHD), and 9-30 dwelling units per acre (MU). The Toll Brothers at Alder Creek project is proposed to build out densities consistent with the applicable land use designations. The land uses and densities proposed are consistent with the General Plan and Specific Plan.

B. Small Lot Vesting Tentative Subdivision Map

Relevant Policies and Requirements

Title 16 of the Folsom Municipal Code (FMC) supplements and implements the State Subdivision Map Act (Government Code Sections 66410 *et seq.*). It is the purpose of this title to regulate and control the division of land within the city and to supplement the provisions of the Subdivision Map Act concerning the design, improvement and survey

data of subdivisions, the form and content of all required maps provided by the Subdivision Map Act, and the procedure to be followed in securing the official approval of the city regarding the maps. FMC Chapter 16.20 requires that applications for Tentative Subdivision Maps be forwarded to the City Council for final action. FMC Chapter 16.28 establishes appropriate local procedures for the implementation of the Vesting Tentative Map Statute of the State Subdivision Map Act.

Analysis

The applicant has submitted a Small-Lot Vesting Tentative Subdivision Map to create a total of 1,424 residential lots with varying densities. As shown in the Preliminary Final Map Phasing Plan in Attachment 14, the applicant plans to file multiple final maps on the tentative map and has included notice of this intent as part of the Project Narrative (Attachment 19). The proposed Small-Lot Vesting Tentative Subdivision Map creates the necessary easements to allow for roads and utilities to facilitate development of the individual parcels, as well as parcels providing shared access, landscaping, and open space that will be owned and maintained by one or more Homeowners Association (HOA). It is important to note that a portion of the proposed subdivision will be a private gated community; as a result, all drives in that area are proposed to be private. The construction of the backbone infrastructure including roadways shall be timed to support the development of these phases.

The applicant has provided a proposed street name list as required under FMC Section 16.16.050. The list has been reviewed by safety agencies and refined based on their input and is included as Attachment 17 to this staff report. Condition No. 23 requires that the street names be shown as approved on the final map(s).

Staff have included a condition (Condition No. 27) that requires the applicant to dedicate easements for water and sewer within the private streets, as well as public utility easements for underground facilities on properties adjacent to the streets (Condition No. 87). Further discussion on roadway improvements and backbone infrastructure are included in subsequent sections of this report.

The applicant requests that the map be vesting and has “VESTING TENTATIVE MAP” printed conspicuously on the face of the tentative map. The applicant has provided preliminary grading, drainage, and utility plans to support the request, as well (Attachments 6 and 7). Water and sewer facilities to the site are provided by the City of Folsom.

Staff have determined that the proposed Small Lot Vesting Tentative Subdivision Map, if approved concurrently with the Planned Development Permit request, complies with all

City requirements (Folsom Municipal Code [FMC], Title 16), as well as with the requirements of the State Subdivision Map Act (Government Code Sections 66410 *et seq.*).

C. Backbone Infrastructure

The construction of the backbone infrastructure was envisioned in both the General Plan and the FPASP to occur as part of and in tandem with new development. This section reviews those requirements and identifies how the Project complies with those requirements.

Relevant Policies and Requirements

- GP Policy PFS 3.1.1 (Water Master Plan). Maintain and implement the Water Master Plan to ensure water facilities are adequate to meet existing customer needs and construct facilities to meet future needs.

- GP Policy PFS 3.1.7 (Water Supply). Provide an adequate supply of water for all users in Folsom now and in the future.

- GP Policy PFS 3.1.11 (Resilient System). Ensure a resilient water storage and distribution system that can rapidly recover to provide water in the event of a disaster.

- *Folsom Plan Area Specific Plan*. Section 13.6 of the FPASP outlines the expected financing, phasing, and maintenance of public infrastructure and facilities in the Plan Area. Various policies are included in this section related to funding mechanisms and restrictions. Section 13.7 of the FPASP outlines the expected phasing for backbone infrastructure and breaks the Plan Area into three districts. Policy 13.7 requires that a conceptual backbone infrastructure phasing plan be submitted for development areas with the first tentative map or building permit submittal, with updates required as needed for subsequent maps.

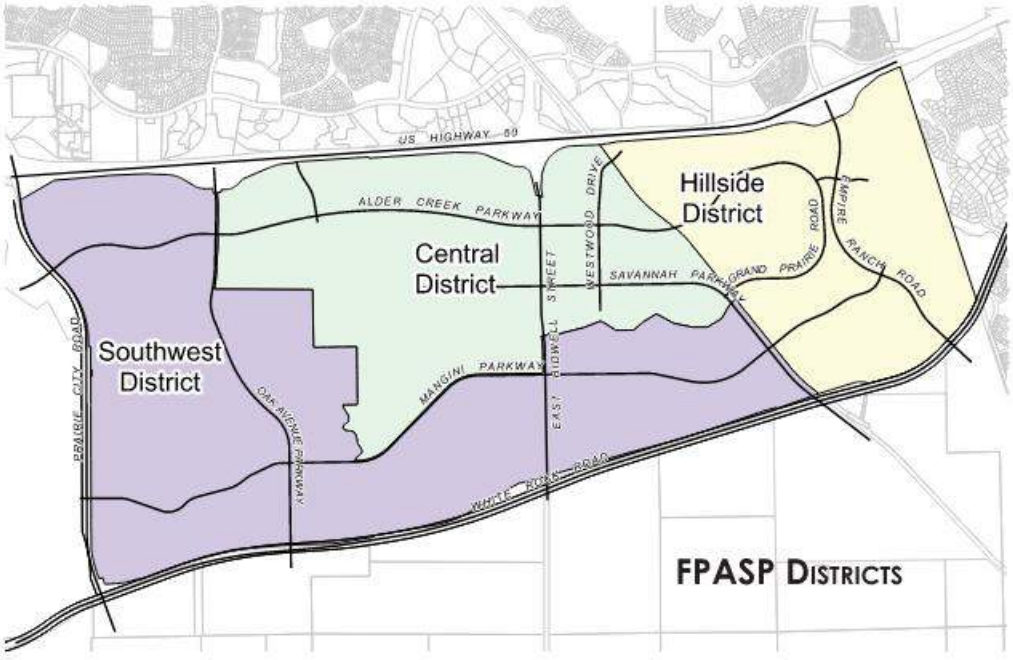
Analysis

The FPASP is a comprehensive plan that calls for the construction of a substantial network of public infrastructure including roads, public transit facilities, water and wastewater systems, stormwater conveyance, as well as the construction of schools, parks, policy and fire protection facilities. To detail how necessary infrastructure development will be funded, a document called the Public Facilities Financing Plan (PFFP) that covers the entire Specific Plan has been adopted and amended from time to time over the life of the Specific Plan. In addition, a Water Master Plan, Non-Potable Water Plan, Wastewater Maste Plan, Storm Drainage Master Plan, and Open Space

Operations and Management Plan have been adopted and amended to guide development of their respective facilities.

The FPASP states that the physical features of the Plan Area naturally divide it into three distinct districts: Central District, Hillside District, and Southwest District, shown in Figure 11 below. The districts represent the logical placement of infrastructure serving the Plan Area. The objective of the phasing is to coordinate the construction phasing of backbone infrastructure and public facilities.

FIGURE 11: FPASP DISTRICTS



The Project is located primarily in the Southwest District. As required under Section 13.7, the applicant and landowners have provided a Conceptual Backbone Infrastructure Phasing Plan for both the Southwest District and the Central District west of East Bidwell Street (refer to Attachment 15). This document identifies all the backbone infrastructure, including roadways and utility infrastructure, to be built out as each of the different parcels develop in the FPASP. Storm drainage detention basins, water tanks, water booster pumps, and roadways including underground utilities are all shown in the attachment. Further discussion on backbone roadway development and phasing can be found in *Section D – Traffic, Access, and Circulation* below. City staff reviewed the proposed Conceptual Phasing Plan and found that it provided the necessary information to determine relative timing and responsibility for completion of necessary backbone infrastructure for the Southwest and Central Districts of the Plan Area.

D. Traffic, Access, and Circulation

Relevant Policies and Requirements

- *GP Policy M 4.1.3 (Level of Service).* Strive to achieve at least a traffic Level of Service "D" (or better) for local streets and roadways throughout the City. In designing transportation improvements, the City will prioritize use of smart technologies and innovative solutions, including roundabouts, that maximize efficiencies and safety. During the course of Plan buildout it may occur that temporarily higher Levels of Service result where roadway improvements have not been adequately phased as development proceeds. However, these situations will be minimized based on annual traffic studies and monitoring programs. Staff will report to the City Council at regular intervals via the Capital Improvement Program process for the Council to prioritize projects integral to achieving Level of Service D or better.

- *GP Policy M 4.1.10 (Prioritization of Roundabouts).* Roundabouts are prioritized as the primary form of intersection control. During the planning and design of new transportation facilities, and when retrofitting existing intersections, an engineering study shall be completed in which roundabout control is thoroughly evaluated to the satisfaction of the Public Works Director. If roundabout control is determined to provide a viable and practical solution, it shall be studied in lieu of, or in addition to, other traffic control alternatives. If other intersection controls are proposed in lieu of roundabout control, the engineering study shall demonstrate that the roundabout is physically infeasible and/or that the operations and the safety of the proposed alternative intersection are determined to achieve the same or better operations and/or offer longer-term advantages when compared to a roundabout intersection.

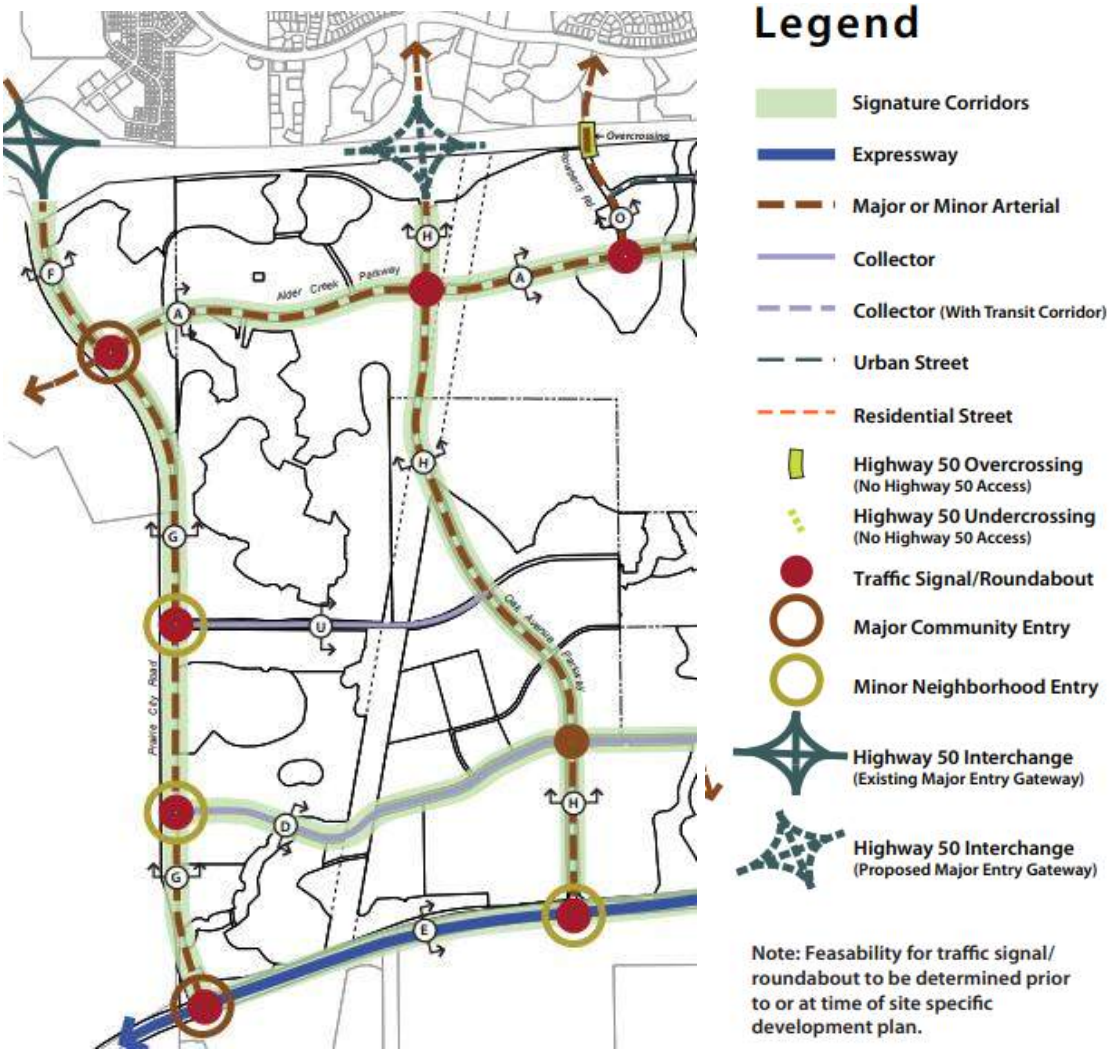
- *GP Policy M 7.1.1 New Development.* Require new development to contribute towards the construction of offsite facilities and provision of services to achieve the City's mobility goals.

- *GP Policy M 7.1.2 Fair Share for Transportation Infrastructure Improvements.* Require all new development to dedicate rights-of-way, construct facilities, or pay its fair share for needed transportation infrastructure improvements that support all travel modes, including pedestrian, bicycle, and transit facilities, roadway improvements, and ITS and transportation demand management (TDM) programs and services.

- *Folsom Area Specific Plan.* The Folsom Plan Area Specific Plan established a series of plans and policies for the circulation system within the entire Plan Area.

The FPASP circulation system was designed with a sustainable community focus on the movement of people and provides a number of mobility alternatives such as walking, cycling, carpooling, and viable forms of public transportation in addition to vehicular circulation. The circulation plan evaluated regional travel, both in terms of connectivity and capacity as well as local internal connections and access. The circulation plan also addressed the concerns of regional traffic, including parallel capacity to U.S. Highway 50, and connectivity with surrounding jurisdictions while considering community-wide connectivity, alternative modes of travel, and the provision of complete streets. A portion of FPASP Figure 7.1 – Circulation that shows the project area is included below for context as well.

FIGURE 12 – FPASP FIGURE 7.1 – CIRCULATION (PORTION)



Analysis

The 2011 Folsom Plan Area Specific Plan Environmental Impact Report/Environmental Impact Statement included not only a detailed analysis of traffic-related impacts within the Plan Area, but also an evaluation of traffic-related impacts on the surrounding communities. In total, there are fifty-five (55) traffic-related mitigation measures associated with development of the FPASP. Many of these mitigation measures are expected to reduce traffic impacts to East Bidwell Street. Included among the mitigation measures are requirements to fund and construct roadway improvements within the Plan Area, pay fair-share contribution for construction of improvements north of U.S. Highway 50, participate in the City's Transportation System Management Fee Program, and Participate in the U.S. Highway 50 Corridor Transportation Management Association. The Project is subject to all traffic-related mitigation measures required by the 2011 FPASP EIR/EIS (Condition Nos. 106-52 to 106-106 in the FPASP). Condition No. 11 requires that the Project comply with all applicable mitigation measures including those related to traffic.

On April 1, 2025, Kimley Horne completed a Traffic Report and Circulation Study (Traffic Study) to inform both the near-term and build-out transportation network necessary to accommodate the addition of the Project. The Traffic Study was used to identify required infrastructure and access improvements along Oak Avenue Parkway and Haven Parkway within the Project boundaries. The Traffic Study included an intersection Level of Service (LOS) analysis in the near term and at buildout for five intersections related to the Project. The analysis concluded that all intersections studied were expected to operate at LOS D, which is the city's operational threshold, or better for both the near term and buildout with the intersections built consistent with the Plan Area roadway improvement requirements.

The Study also reviewed the Project roadway network against City of Folsom Fire Code to ensure adequate circulation and access for emergency vehicle response and found that the Project design satisfies the basic geometric elements for clearance and unobstructed width and height for fire apparatus.

Finally, the Study also reviewed planned bicycle and pedestrian considerations. Per the Specific Plan, sidewalks are planned along all project roadways. Class II bike lanes are planned along Oak Avenue Parkway, Alder Creek Parkway, Mangini Parkway, Haven Parkway, and Prairie City Road. Class I bike paths are also planned in the open space and cross Haven Parkway and Oak Avenue Parkway. Roadway cross sections included with the Project's Tentative Subdivision Map include sidewalks and Class II bike lanes in conformance with Specific Plan requirements.

As discussed above in *Section C – Backbone Infrastructure*, the FPASP circulation system was envisioned to be phased with the development of the Plan Area. The Project is primarily within the Southwest Districts of the Plan Area. While the Project's Traffic

Study identified a discrete set of roadway and intersection improvements for access to and circulation within the Project, it did not include an analysis of the overall circulation system improvements that may be required as part of the overall backbone phasing required by the FPASP. Staff informed the applicant that some or all of the following circulation system improvements would need to be considered as part of this Project:

- Improving part of Prairie City Road from White Rock Road to the U.S. Highway 50 Interchange.
- Improving all of Oak Avenue Parkway from Mangini Parkway to Alder Creek Parkway.
- Improving part of Alder Creek Parkway from Prairie City Road to East Bidwell Street.
- Improving part of Mangini Parkway from Prairie City Road to Oak Avenue Parkway.
- Installing signalized intersections along Prairie City Road.
- Installing roundabouts at major intersections along Oak Avenue.

Staff from the Community Development Department, Public Works Department, and Fire Department then worked with the applicant team and property ownership over many months to review options for roadway improvements that would move the backbone system phasing plan forward in a logical and realistic manner but would be responsive to financing and timing constraints facing the applicant during Project buildout. In addition, the City of Folsom began coordinating with the County of Sacramento to develop an interim cross section for Prairie City Road that would meet the needs of the City, the County, quarry owners with rights to traverse the roadway, and future residents of both the Project and future development on the west side of Prairie City Roadway in the unincorporated county. This effort is ongoing and the proposed updated roadway cross section will be brought forward to the City Council and Board of Supervisors for consideration later this summer.

Ultimately, a set of Conditions of Approval were developed that balance the needs of all parties, recommended by city staff, and accepted by the Project applicant. These are Condition Nos. 33 through 39 in Attachment 3. Items of note are listed below:

- Roadway development will generally follow the expected Final Map Preliminary Phasing Plan (Attachment 14) to meet the needs of residents while minimizing upfront infrastructure costs to the extent practicable.
- Three intersections along Oak Avenue Parkway will be required to be developed as Roundabouts in compliance with the city's Roundabout First policy. These are the intersections of Oak Avenue and Mangini Parkway, Oak Avenue and Haven Parkway, and the intersection of Oak Avenue Parkway and Alder Creek Parkway.
- At an early phase of project development, the applicant will be required to install an Emergency Vehicle Access (EVA) Road that connects the northern end of the

Oak Avenue Parkway roadway segment within the Project to Prairie City Road, via an access road segment that follows the eventual Alder Creek Parkway alignment. This EVA along with existing perimeter access points to White Rock Road to the south and East Bidwell Street to the east provides the necessary ingress/egress for emergency vehicles to the Project and vicinity until the balance of the roadways in the area are completed.

- The applicant will be required to develop or fund a segment of Prairie City Road, roughly from Alder Creek Parkway to the north to just south of Haven Parkway along with signalization at these two intersections. The improvements will either reflect the roadway cross section as adopted by the FPASP or an alternative as negotiated by the City and County.

With these conditions and adoption of the FPASP Central and Southwest Districts Conceptual Backbone Infrastructure Phasing Plan (Attachment 15), staff believe that the Project is consistent with General Plan and Plan Area policies related to Traffic, Access, and Circulation.

E. Open Space and Oak Woodland Preservation

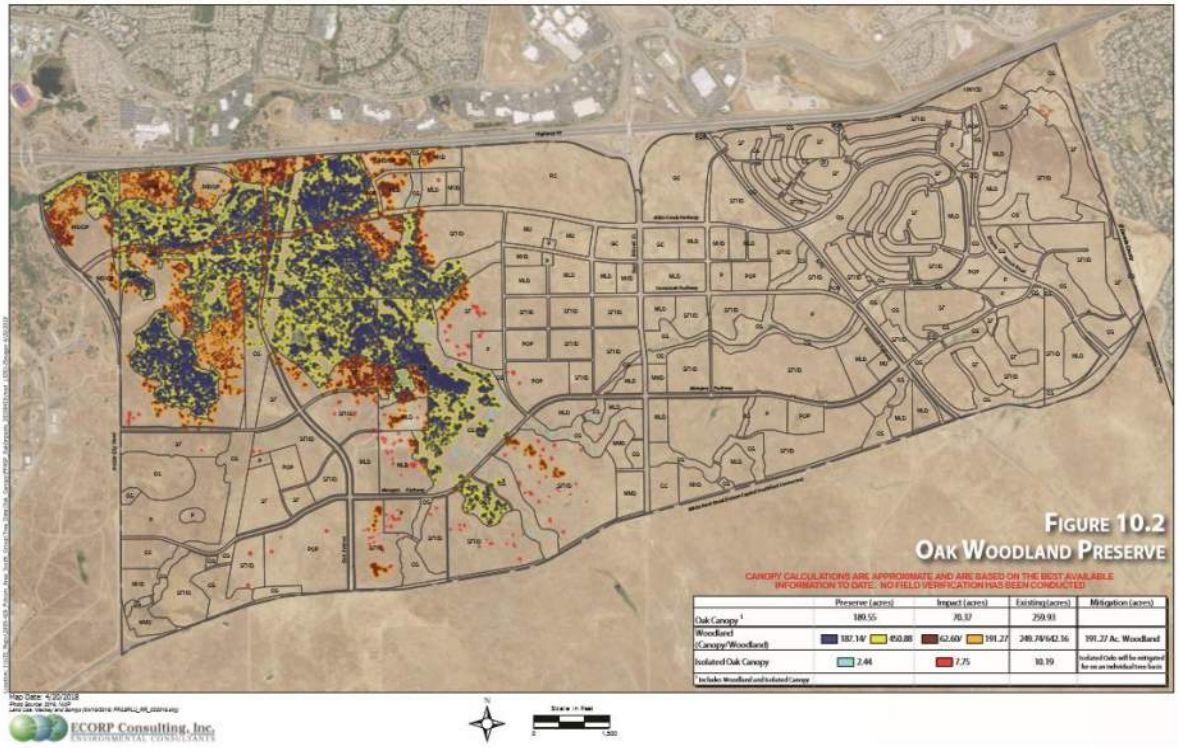
Relevant Policies and Requirements

As required by the City of Folsom Charter Section 7.08(C) (Measure W), the FPASP preserves thirty percent of the Plan Area in perpetual open space that will encompass valuable natural resources such as oak woodlands. FPASP Policy 8.15 states that all entitlements within the FPASP shall be reviewed to ensure that thirty percent (30%) of the Plan Area is maintained as natural open space to preserve oak woodlands and sensitive habitat areas.

The FPASP uses the California Oak Woodland Conservation Act of 2001 definition of oak woodlands as “oak stands with a greater than 10% canopy cover.” The oak woodlands, isolated oak tree canopy, and individual oak trees within the Plan Area are exclusively located in the western section (west of East Bidwell Street) and consist of 642 acres of oak woodland habitat with a canopy cover of 249-acres (approximately 39% canopy cover). Additionally, the Plan Area contains 10 acres of isolated oak tree canopy that is not classified as oak woodlands because it has less than 10% canopy cover.

Figure 13 below illustrates the location of the blue oak woodlands and individual oak trees within the Folsom Plan Area. The light green areas shows those oak woodland areas and individual oaks expected to be preserved under the FPASP and the red areas show those anticipated to be removed as a result of development.

FIGURE 13: OAK WOODLAND PRESERVE EXHIBIT



The FPASP includes several mitigation objectives and policies regarding oak woodlands and isolated oak trees to ensure the preservation of large expanses of oak woodlands within the Folsom Plan Area. However, the FPASP also recognizes that required infrastructure to accommodate development will result in unavoidable impacts to oak woodlands and isolated oak trees. In particular, the FPASP identified approximately 131 acres of unavoidable oak woodland impacts for construction of Plan Area backbone infrastructure and the Oak Avenue interchange. In addition, approximately 114 acres of potential oak woodland impacts were identified by the FPASP in conjunction with construction on residential and non-residential parcels in the Plan Area. The FPASP also identifies approximately 8.41-acres of isolated oak tree canopy that may be impacted by construction of backbone infrastructure as well as development on residential and non-residential parcels in the Plan Area. Finally, the FPASP requires that a minimum of 396.52 acres of existing on-site oak woodlands be preserved overall.

Analysis

Open Space Preservation

The Project includes modification of the boundaries between Plan Area land use designations, including the boundaries of the OS (Open Space) designation, requested through a Minor Administrative Modification (MAM). The applicant states that significant work went into design of the land plan for the development to create a lotting pattern and

supporting infrastructure plan that is both efficient and sensitive to the OS areas that surround much of the Project site. This resulted in an increase of approximately 5.9 acres of open space to the overall OS total because of this Project. As a result, staff determined that the project remains consistent with the City of Folsom Charter Section 7.08(C) (Measure W) because it maintains and even adds to the 30% open space preservation requirement.

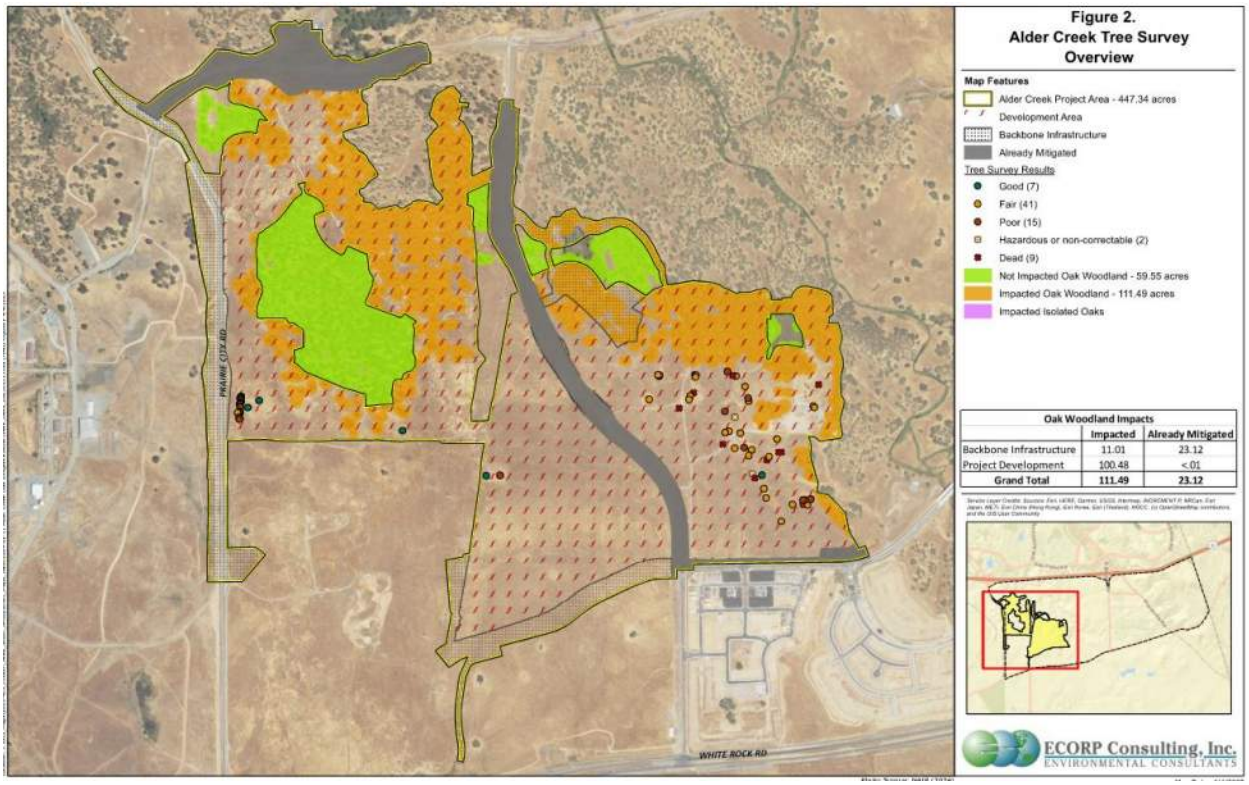
On-Site Tree Impacts

The Project Area consists of relatively flat to rolling terrain with predominantly undeveloped annual grassland and blue oak woodland. A powerline bisects the center of the Project Area running roughly north-south with a few access roads through the eastern section of the Project Area.

ECORP Consulting, Inc. prepared an Arborist Report (dated April 2025 and included with this report as Attachment 22) which includes a conceptual tree preservation/removal plan and strategy with guidance as provided by the FPASP, as shown in Section 10 (Resource Management & Sustainable Design, Subsection 10.2.3 Oak Woodlands & Isolated Trees). Among other Policies in this Section, Policy 10.15 of the FPASP provides specific guidance as to the preservation and/or removal of trees. Together with the Arborist Report, these criteria were utilized to help determine the practicality and need for tree preservation/removal within development areas on the project site. Specific tree removal data and justification are included in the Arborist Report.

Figure 9 below shows the expected oak woodland impacts for the project. Note: this figure from the Arborist Report is included here to provide a high-level view of the Project's impact to isolated oaks and oak woodland. The applicant expects further refinement of impact areas and retention of isolated trees in the western area of the project site.

FIGURE 9: ALDER CREEK TREE SURVEY OVERVIEW



The FPASP EIR/EIS (Mitigation Measure 3A.3-5) requires the applicant to submit an Oak Tree Mitigation Plan consistent with the approved Oak Tree Mitigation and Monitoring Plan for the FPASP to mitigate for impacts to the oak woodland preserve areas and isolated oak tree canopy areas located on the project site. Conditions have been placed on the Project that require the applicant to submit the Oak Tree Mitigation Plan for the areas of the oak woodland canopy that are affected and obtain tree removal permits for individual oak trees as required. This will keep the project in conformance with the required mitigation measures.

FPASP Oak Woodland Preservation

The Specific Plan includes Policy 10.13 which requires that development "preserve and protect in perpetuity approximately 396.52-acres of existing oak woodlands." To support this policy, the Specific Plan includes the following discussion for Oak Woodland Mitigation:

> *To fully mitigate for impacts to oak woodlands, the FPASP will implement one or more of the mitigation measures listed below. Together, the mitigation measures will permanently protect approximately of [sic] 396.52-acres of existing Plan Area oak woodlands and create approximately of [sic] 245.63-acres of new oak woodland habitat either on-site or with a combination of on-site and off-site*

locations(s). (FPASP page 10-13).

Oak Woodland canopy calculations done in support of the Specific Plan estimated that approximately 450.88 acres of Oak Woodland are located within the Open Space preserve areas. The Project includes impacts to oak woodlands within the Open Space preserve areas due primarily to grading along the project perimeter and development of stormwater basins to support development. Staff, including the City's Urban Forester, worked with the applicant and their consultant, ECORP, to look at minimizing wherever possible the loss of oak woodland canopy and isolated oak trees. In several cases, the applicant revised lots or eliminated some residential lots to protect healthy isolated oak trees. However, the applicant could not relocate or reduce in size the detention basins required for the project due to a number of constraints (e.g., lack of alternate location, drainage area needed based on number of units, power line corridors, etc.).

Staff requested that the applicant provide an analysis that demonstrated whether their project would reduce the amount of oak woodland canopy below the 396.52-acre threshold identified in the specific plan. Working with ECORP and McKay & Somps, the applicant was able to demonstrate that their project would not reduce the oak woodland canopy below the threshold. In fact, there would be approximately 30 acres of additional oak woodland that would remain. However, staff note that these calculations do not include potential canopy impacts from future development. The applicant provided an exhibit showing how they determined their potential impact to oak woodland canopy and the balance of canopy expected to remain after completion of their project. It is included as Attachment 23 to this report.

Nevertheless, the size of the detention basins and other backbone infrastructure required in this area for this development, including basins located in the open space area, results in more oak woodland canopy removal in the Open Space areas than originally envisioned in the FPASP. While this project does not reduce the amount of oak woodland canopy below the threshold, other future development projects as well as future infrastructure projects, such as the Oak Avenue Parkway Interchange, may result in oak woodland tree canopy loss that would exceed the threshold. If that were to happen then either those projects would have to be scaled back to avoid that loss or an amendment to the FPASP along with additional environmental review and Council approval would be required before that oak woodland canopy reduction could occur.

Conditions 61 through 65 in Attachment 3 specifically address the required measures involving the protection of trees and conservation areas. Furthermore, these conditions also identify the measures that need to be taken by the applicant to address the loss of the oak woodland canopy and isolated oak trees including the use of conservation easements to protect oak woodlands elsewhere in the region and new plantings.

F. Trails, Parks, Fire Station, and School Site

The Project is adjacent to multiple Open Space parcels that are expected to include Class I bikeways and trails as well as connection points for pedestrian and bicycle access at various locations. In addition, the Project includes sites that will be transferred to the City for a Neighborhood Park and Fire Station. Finally, the Project includes a property adjacent to the Neighborhood Park site that will be transferred to the Folsom Cordova Unified School District (FCUSD) to develop as a future elementary school site referred to by the school district as Granite Springs Elementary School. All these expected uses are consistent with the Plan Area Land Use Plan.

Relevant Policies and Requirements

Trails

- FPASP Policy 7.16: A system of sidewalks, trails, and bikeways shall internally link all land uses and connect to all existing or planned external street and trail facilities contiguous with the Plan Area to provide safe routes of travel for pedestrians and bicyclists as depicted herein and as indicated on the applicable roadway sections. Pedestrian and bicycle facilities shall be designed in accordance with city design standards, including the latest version of the *Bikeway Master Plan*, the *FPASP*, and the *FPASP Community Design Guidelines*.

- FPASP Policy 7.21: All Plan Area land uses shall be located within approximately ½ mile of a Class I bike path or a Class II bike lane.

- FPASP Policy 8.8: Locate Class I bicycle paths and paved and unpaved trails throughout the open space.

Parks

- GP Policy PR 1.1.12 (*Neighborhood Parks*): Strive to ensure all neighborhoods, new and established, have parks that serve as community focal points.

- FPASP Policy 4.17: Land shall be reserved for parks as shown in Figure 4.3 – Specific Plan Land Use Designations and Table 4.2 – Land Use Summary. On future tentative subdivision maps or planned development applications, park sites shall be within 1/8 of a mile of the locations shown in Figure 4.3 – Specific Plan Land Use Designations. Park sites adjacent to school sites should remain adjacent to schools to provide for joint use opportunities with the Folsom-Cordova Unified School District. Park sites adjacent to open space shall remain adjacent to open space to provide staging areas and access points to the open space for the public.

- FPASP Policy 4.19: Parks shall be located throughout the Plan Area and linked to

residential neighborhoods via sidewalks, bike paths and trails, where appropriate. During the review of tentative maps or planned development applications, the city shall verify that parks are provided in the appropriate locations and that they are accessible to residents via sidewalks, bike paths and trails.

Fire Station

- GP Policy PFS 7.1.1 (*Adequate Facilities and Services*): Strive to provide fire department facilities, equipment and vehicles, and services to adequately meet the needs of existing and future development.

- GP Policy PFS 7.1.4 (*Optimal Siting*): Require that new fire stations are strategically located to ensure optimal response time and physical barriers are considered in the siting of new stations.

School Site

- GP Policy PFS 2.1.1 (*School District Coordination):* Coordinate with the school districts serving Folsom to ensure that school sites are dedicated or reserved for purchase by the districts so that:

  1. Each residential neighborhood will contain or have access to the appropriate elementary school according to school district standards;

  2. Children do not have to cross an uncontrolled intersection on an arterial road to reach an elementary school;

  3. Elementary schools can be reached on foot by most of the neighborhood residents; and

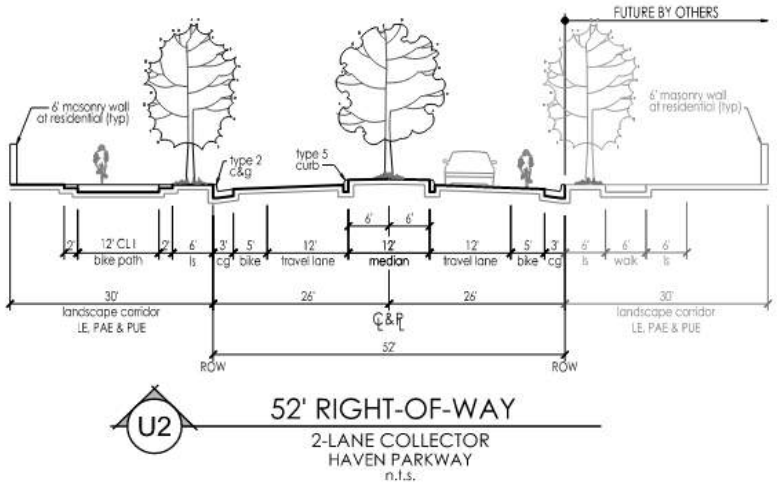
  4. A joint park/school site can be developed wherever possible.

Analysis

Trails

The Project includes sidewalks, trails, and bikeways throughout that will provide internal and external links. Residential streets will all include either attached or detached sidewalks, with bicycles sharing lanes. Collector streets will either have a dedicated on-street bike lane (Class II facility) or a separate off-street Class I bicycle facility within the landscape corridor. These facilities will in turn connect to adjacent open space Class I facilities and all existing or planned external street and trail facilities contiguous with the Plan Area to provide safe routes of travel for pedestrians and bicyclists. Figure 14 below shows the proposed roadway cross section for Haven Parkway, which will serve as a collector street and provide the link between residential streets and major roadways and open space corridors in the western area of the Project. Pedestrian and bicycle facilities shall be designed in accordance with city design standards.

FIGURE 14: HAVEN PARKWAY ROADWAY CROSS SECTION



The Project's proposed pedestrian and bicycle facilities ensure that all proposed uses are located within approximately ½ mile of a Class I bike path or a Class II bike lane. Attachment 8 (Illustrative Master Plan Exhibit) provides a simple representation of the Class II bike lanes and access points to Class I bike paths within the Open Space areas surrounding the project. Figure 15 below shows details from Attachment 8 for access points proposed along the powerline corridor and east side in the highest density area of the project.

FIGURE 15: ILLUSTRATIVE MASTER PLAN DETAILS – CLASS I TRAIL ACCESS

FPASP Figure 7.32 (Bikeway Plan) shows the overall on- and off-street bike path and lane plan for the Plan Area. Open Space areas around the Project will include multiple miles of Class I bike paths. The Folsom Plan Area Development Impact Fee and the Specific Plan Infrastructure Fee (SPIF) are the mechanisms to collect fees from development for trail improvements in the Open Space area. This Project will pay its fair share of impact fees that will then be used to develop the trail system in the adjacent Open Space areas.

Parks

The FPASP requires that Planned Developments, such as this Project, demonstrate compliance with two policies related to the location and accessibility of public parks (FPASP Policies 4.17 and 4.19). Specifically, the Planned Development application must demonstrate that any included park sites are within 1/8 of a mile of the locations shown in Figure 4.2 – Specific Plan Land Use Designations and during the review of Planned Development applications, the city shall verify that parks are provided in the appropriate locations and that they are accessible to resident via sidewalks, bike paths and trails.

The Project includes one public park site, Neighborhood Park 5. The proposed park location is the same as anticipated in the Specific Plan, with minor modifications to the park boundaries, and it will be accessible to residents via sidewalks, bike paths, and trails as shown in the roadway cross sections included in Attachment 5 (Small-Lot Vesting Tentative Subdivision Map). The Project does not request modifications to the required on-street bikeways. Further, conditions have been included that require pedestrian access at park entries, including any required pedestrian roadway crossings. Finally, the park site remains adjacent to the proposed elementary school site, which allows for potential joint use. Staff of the City Parks Department reviewed the Project and proposed perimeter improvements for the Neighborhood Park site and found them acceptable with the included conditions.

Fire Station

The FPASP anticipated that two fire stations would be necessary to serve the Plan Area at buildout. One station (Station 34) located on Westwood Drive, east of East Bidwell Street, is operational. FPASP Figure 11.1 (Public Services & Facilities) included a conceptual location for a second site in the Project area, at the northeast corner of Oak Avenue Parkway and Haven Parkway. The applicant team proposed to formalize a fire station site as part of this map request but shift the site across to the west side Oak Avenue, at the northern edge of the Project development area. The applicant proposes to create a 2.1 acre site that would be dedicated on the Final Map with improvements completed and access points located to the satisfaction of the City of Folsom Fire Department. Further, Oak Avenue Parkway north to Alder Creek Parkway would be improved for emergency vehicle ingress and egress to Prairie City Road. Figure 16 below is a detail of Attachment 5 (Small-Lot Vesting Tentative Subdivision Map) showing the

proposed fire station site.

FIGURE 16: DETAIL OF FIRE STATION SITE

Fire Department personnel reviewed the new location and proposed emergency access improvements and confirmed that they would adequately meet the needs of existing and future development.

School Site

Adjacent to the park site is an anticipated elementary school site (Elementary School No. 5), which would be deeded to the Folsom-Cordova Unified School District (FCUSD). The site is consistent with the FPASP expected location and is adjacent to the proposed park site. Staff of the FCUSD provided comments on the Project and proposed improvements around the school site. They requested that the Project be conditioned to ensure that adequate pedestrian facilities are included to ensure safe access for students both directly adjacent to the school site and crossing Oak Avenue Parkway. Condition No. 102 has been included requiring ongoing coordination with FCUSD on the site access and perimeter improvements.

G. Planned Development Permit

For staff analysis of the applicant's request for a Planned Development Permit, the following policies and standards apply:

- FPASP Sections 13.2 (Approvals and Entitlements) and A.2.3 (Overlay Combining Zones). To allow greater flexibility in the design of integrated developments than otherwise possible through strict application of FPASP development standards certain Plan Area parcels are included in a Planned Development District (PD) per the criteria outlined in Folsom Municipal Code (FMC) Chapter 17.38.

- FMC Section 17.38.100 (Review Criteria). In its review of planned developments, the planning commission shall be governed by the criteria in this section. Review criteria include the following:
    - The project complies with the intent and purposes of this chapter, the applicable ordinances of the city, and the general plan.
    - Minor modifications to applicable development standards will result in a development that is superior to that obtained by rigid application of the standards.
    - The project can be found physically, functionally, and visually compatible with neighboring uses and characteristics.
    - Necessary public facilities, sanitation services, and emergency public safety services are available and adequate to serve the project.
    - Whether the proposed development causes adverse environmental impacts which have not been mitigated to an acceptable level.
    - The proposed development will not cause unacceptable vehicular traffic levels on surrounding streets and that there be adequate internal traffic circulation, including ingress and egress.
    - The project will not be detrimental to health, safety, or the general welfare of the persons or property within the vicinity of the development or the city as a whole.

- FPASP Section 13.2 (Implementation – Approvals and Entitlements). All Plan Area projects including commercial, industrial/office park, mixed-use, multi-family and single-family residential projects that are part of a tentative subdivision map submittal, must prepare design guidelines for review and approval as part of the Design Review process outlined above. Project level design guidelines may include one or more land parcels and one or more land uses. Design review guidelines shall address project details including placement of building, architectural details, colors, grading, landscaping and lighting, etc.

Analysis

The Project is requesting a Planned Development (PD) Permit in compliance with the existing PD Overlay Zoning, per FPASP Sections 13.2 (Approvals and Entitlements) and A.2.3 (Overlay Combining Zones). The PD Permit includes consideration of development standard deviations and project level architectural and landscape design guidelines. Staff have reviewed the proposed development standard deviations and architectural and landscape design guidelines and believe that they comply with the intent and purpose of the FPASP and meet the review criteria under FMC Section 17.38.100.

Compliance with FMC Chapter 17.38
First, the Project complies with the intent of FMC Chapter 17.38 in that it presents a creative and efficient use of land through a thoughtful lotting pattern, minor reductions in some lot sizing for medium- and high-density areas to create a wider variety of lot sizes, and the inclusion of small-lot single family residential in areas proposed for higher density. This allows for a wider variety of housing products (e.g., duets, 4-packs, and 6-packs) and more efficient use of privately controlled open space with private amenities and parks providing greenspace for the residents of the more dense areas. As conditioned, the Project will comply with all applicable ordinances of the city. In addition, the Project does not request any amendments to the General Plan and as demonstrated elsewhere in this report, complies with all applicable General Plan policies.

Consistency with City Objectives, Policies, Development Standards
Other than the minor modifications requested for reduced lot sizing and the small-lot single family lotting pattern to support more efficient use of land and creation of shared open space, the Project is consistent with the objectives, policies and requirements of the development standards of the city.

Physical, Functional, Visual Compatibility
The Project includes Architectural Design Guidelines and Landscaping Design Guidelines that provide a coherent design plan for the project overall. They also provide specific architectural and landscape elements to be incorporated into the public areas of the Project that are compatible with adjacent development, which at this time is limited to the Toll Brothers at Regency project to the southeast of the Alder Creek site. Finally, the applicant has provided an overall plan for residential design and landscaping for a project that demonstrates coherence and quality.

Adequate Facilities and Services
Fourth, as analyzed in the Backbone Infrastructure section of this report, staff can confirm that as conditioned, necessary public facilities will be available to serve the Project. In addition, as analyzed in the Traffic, Access, and Circulation section of this report, staff can confirm that as conditioned, the Project makes adequate provisions for furnishing sanitation services and emergency public safety services to the development.

Environmental Impacts
A Streamlined Conformity Analysis was prepared for the Project to identify and assess compliance of the Project with the Folsom Plan Area Specific Plan (FPASP) Environmental Impact Report/Environmental Impact Statement. The Conformity Analysis found that the proposed project implements and is consistent with the FPASP, and none of the factors set forth in CEQA Guidelines Section 15162 related to new or additional impacts are present or have been identified. The Conformity Analysis is included with this report along with supporting Appendices as Attachment 20.

Vehicular Traffic Levels
As analyzed in the Traffic, Access, and Circulation section of this report, staff can confirm that as conditioned, the Project will not cause unacceptable vehicular traffic levels on surrounding streets and that there is adequate internal traffic circulation and ingress/egress for the proposed development.

Health, Safety, and the General Welfare
Through the proposed Conditions of Approval and conformance with city ordinances and conditions that require the provision of infrastructure including roadways, utilities, and sanitation adequate to maintain roadway traffic levels, utility services, and public safety services, the proposed development will not be detrimental to health, safety and the general welfare of the persons or property within the vicinity of the proposed development and the city as a whole.

H. Inclusionary Housing Plan

The FPASP and Section 17.104 of the FMC require all for-sale residential development projects consisting of 10 or more units satisfy the city's inclusionary housing requirement. One option for satisfying the requirement is to pay a fee to the city in lieu of constructing the required number of inclusionary units for the development project. Consistent with the requirements of Section 17.104.060(F)(5) of the FMC, the applicant has submitted a signed letter stating that their intent is to pay the in-lieu fee for this project (Attachment 18). Additionally, Condition No.32 requires payment of the applicable in-lieu fee, as required by FMC Section 17.104.060(F)(5). Staff have reviewed the intent letter and believe it, in combination with Condition No. 32, complies with the requirements of FMC Section 17.104 in that it confirms the applicant will satisfy the Inclusionary Housing Ordinance by paying fees.

I. Minor Administrative Modification

Relevant Policies and Requirements

As set forth in Section 13.3 (Administrative Procedures) of the FPASP, Minor Administrative Modifications (MAMs) to the FPASP that are consistent with and do not substantially change its overall intent, such as minor adjustments to the land use locations and parcel boundaries shown in Figure 4.2 - Specific Plan Land Use and Figure 4.3 - Plan Area Parcels and the land use acreages shown in Table 4.2 – Land Use Summary may

be approved, provided the following criteria are met:

- The proposed modification is within the Plan Area.
- The modification does not reduce the size of the proposed town center.
- The modification retains compliance with City Charter Article 7.08, previously known as Measure W.
- The general land use pattern remains consistent with the intent and spirit of the FPASP.
- The proposed changes do not substantially alter the backbone infrastructure network.
- The proposed modification offers equal or superior improvements to development capacity or standards.
- The proposed modification does not increase environmental impacts beyond those identified in the EIR/EIS.
- Relocated park or school parcels continue to meet the standards for the type of park or school proposed.
- Relocated park or school parcels remain within walking distance of the residents they serve.

Analysis

Staff reviewed the proposed MAM, which consists of requests to increase the number of FPASP Parcels (utilized to track residential unit allocations within the Plan Area) by dividing some larger parcels, modifying Specific Plan Land Use boundaries to reflect more detailed land planning around open space resources and the public park and school site, and amending the roadway cross section for Alder Creek Parkway against the above criteria and concluded that the proposed change meets all that are applicable, as analyzed below.

Within the Plan Area and No Reduction in Town Center Area
The affected area is all within the FPASP and does not include any parcels within the Town Center.

Compliance with Measure W
The proposed changes to land use designations are compliant with Measure W in that they increase Open Space designated area by 5.9 acres. This maintains, and even increases, the area designated within the Plan Area as Open Space and thus complies with the Measure W requirement that 30% of the Plan Area remain open space.

Consistent Land Use Pattern and No Substantial Alteration to Backbone Infrastructure
The requested modifications to land use designation boundaries are minor in nature and do not modify the overall Plan Area land use pattern. The requested modification to the

Alder Creek Parkway roadway cross section does not substantially alter the backbone infrastructure network as it retains expected vehicle, transit, and pedestrian capacity.

Equal or Superior Improvements to Development Capacity or Standards
The proposed changes provides better roadway alignment. Specific to the requested modification to the Alder Creek Parkway roadway cross section, the reduction of the overall cross section from 100 feet to 82 feet allows for bus transit in mixed flow lanes, given that Regional Transit is not likely to pursue Bus Rapid Transit in the corridor. In turn, this allows for a more efficient reduced roadway cross section but retains space for bus pull outs along the roadway while maintaining space for pedestrians and cyclists.

No Increase in Environmental Impacts
A Streamlined Conformity Analysis was prepared for the Project to identify and assess compliance of the Project with the Folsom Plan Area Specific Plan (FPASP) Environmental Impact Report/Environmental Impact Statement. The Conformity Analysis found that the proposed project implements and is consistent with the FPASP pursuant to CEQA Guidelines Section 15182, and none of the factors set forth in CEQA Guidelines Section 15162 related to new or additional impacts are present or have been identified. The Conformity Analysis is included with this report along with supporting Appendices as Attachment 20.

Relocated Park or School Sites
This Project does not propose relocation of park or school sites.

Based on the analysis above, the proposed MAM meets all of the necessary criteria. Therefore, staff support approval of the requested MAM as part of this entitlement package.

J. PUBLIC NOTICING

A notice was posted in the Folsom Telegraph and mailed to property owners within 300-feet of the project site prior to the Planning Commission hearing that met the requirements of FMC Section 17.60.030.

As of the writing of this report, one public comment was received on the project and provided to the Planning Commission for consideration in Attachment 24.

K. ENVIRONMENTAL REVIEW

Pursuant to CEQA Guidelines Section 15182(c), where a public agency has prepared an EIR on a specific plan after January 1, 1980, a residential project undertaken pursuant to and in conformity to that specific plan is exempt from CEQA if the project meets the requirements of this section. Residential projects covered by this section include but are not limited to land subdivisions, zoning changes, and residential planned unit

developments.

The City of Folsom as Lead Agency, had a Conformity Analysis prepared by ECORP Consulting, Inc. to identify and assess compliance of the Alder Creek Subdivision Tentative Map Project (Proposed Project) with the program-level Folsom Plan Area Specific Plan (FPASP) Environmental Impact Report/Environmental Impact Statement (EIR/EIS, State Clearinghouse [SCH]# 2008092051). This Conformity Analysis also satisfied CEQA (Public Resources Code [PRC], Section 21000 et seq.) and state CEQA Guidelines (Title 14, California Code of Regulations [CCR] 15000 et seq.). The Conformity Analysis is included with this report along with supporting Appendices as Attachment 20.

The Conformity Analysis found that an Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Folsom South of U.S. Highway 50 Specific Plan Project was prepared jointly by the City of Folsom and U.S. Army Corps of Engineers (USACE) to fulfill requirements of the California Environmental Quality Act (CEQA) and National Environmental Policy Act, respectively. A Notice of Determination (NOD) for the EIR was filed by the City of Folsom on June 15, 2011 (State Clearinghouse [SCH] #2008092051), and a Record of Decision for the EIR/EIS was filed by the USACE on August 12, 2011, (SPK-2007-02159). A Mitigation Monitoring and Reporting Program (MMRP) was prepared and adopted with the FPASP and is a binding document applicable to the Alder Creek Property development (Appendix A, Mitigation Monitoring and Reporting Program). The approved MMRP outlines mitigation measures required for all projects located within the FPASP. In addition, an Initial Study (IS) and Mitigated Negative Declaration (MND) was prepared for the FPASP Backbone Infrastructure (BB IS/MND), and an NOD was filed by the City of Folsom on February 25, 2015 (SCH# 2114122018). The BB IS/MND outlines mitigation measures specifically for Backbone Infrastructure development. The mitigation measures in the BB IS/MND mirror the original EIR/EIS with some modifications.

The Conformity Analysis found that the proposed project implements and is consistent with the FPASP, and none of the factors set forth in CEQA Guidelines Section 15162 are present or have been identified. The Conformity Analysis also includes a review of the impacts and mitigation measures addressed in the EIR/EIS for the FPASP, which concluded that the proposed project will not result in any impacts not already identified, and that mitigation measures in the FPASP EIR/EIS will be sufficient to address the proposed project's impacts. Planning staff have reviewed the Conformity Analysis and supporting Appendices and found it satisfactory. Therefore, pursuant to CEQA Guidelines Section 15182, the City finds that the project is exempt from CEQA. The City further finds that the project is also exempt pursuant to Government Code Section 65457.

RECOMMENDATION AND PLANNING COMMISSION ACTION

Recommend that the City Council confirm staff's determination that the Toll Brothers at Alder Creek project is exempt from CEQA pursuant to CEQA Guidelines Section 15182 and Government Code Section 65457, and none of the factors described in CEQA Guidelines Section 15162 occur, and recommend approval of the requested Small Lot Vesting Tentative Subdivision Map, Planned Development Permit, Inclusionary Housing Plan, and Minor Administrative Modification for development of the Toll Brothers at Alder Creek project (MSTR2025-00084), based on the findings (Findings A-BB), and subject to the conditions of approval attached to the staff report (Conditions 1-105).

GENERAL FINDINGS

A. NOTICE OF HEARING HAS BEEN GIVEN AT THE TIME AND IN THE MANNER REQUIRED BY STATE LAW AND CITY CODE.

B. THE PROJECT IS CONSISTENT WITH THE GENERAL PLAN AS AMENDED AND THE FOLSOM PLAN AREA SPECIFIC PLAN AS AMENDED, WITH APPROVAL OF THE REQUESTED MINOR ADMINISTRATIVE MODIFICATION.

CEQA FINDINGS

C. THE CITY, AS LEAD AGENCY, PREVIOUSLY CERTIFIED AN ENVIRONMENTAL IMPACT REPORT/ENVIRONMENTAL IMPACT STATEMENT FOR THE FOLSOM PLAN AREA SPECIFIC PLAN.

D. THE CITY HAS DETERMINED THAT THE TOLL BROTHERS AT ALDER CREEK PROJECT IS UNDERTAKEN TO IMPLEMENT AND IS CONSISTENT WITH THE FOLSOM PLAN AREA SPECIFIC PLAN.

E. THE CITY HAS DETERMINED THAT THE IMPACTS OF THE TOLL BROTHERS AT ALDER CREEK PROJECT ARE ADEQUATELY ADDRESSED BY THE FINAL ENVIRONMENTAL IMPACT REPORT FOR THE FOLSOM PLAN AREA SPECIFIC PLAN AND ASSOCIATED MITIGATION MEASURES AND THAT THE TOLL BROTHERS AT ALDER CREEK PROJECT IS EXEMPT FROM THE REQUIREMENTS OF CEQA PURSUANT TO GOVERNMENT CODE SECTION 65457 AND CEQA GUIDELINES 15182(C).

F. NONE OF THE EVENTS SPECIFIED IN SECTION 21166 OF THE PUBLIC RESOURCES CODE OR SECTION 15162 OF THE CEQA GUIDELINES HAVE OCCURRED.

G. THIS PROJECT IS EXEMPT FROM CEQA IN ACCORDANCE WITH GOVERNMENT CODE SECTION 65457 AND SECTION 15182 OF THE CEQA GUIDELINES.

TENTATIVE SMALL-LOT VESTING SUBDIVISION MAP FINDINGS

H. THE PROPOSED SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP IS CONSISTENT WITH THE CITY'S SUBDIVISION ORDINANCE AND THE SUBDIVISION MAP ACT IN THAT THE PROJECT IS SUBJECT TO CONDITIONS OF APPROVAL THAT WILL ENSURE THAT THE PROJECT IS DEVELOPED IN COMPLIANCE WITH CITY STANDARDS.

I. THE PROPOSED SUBDIVISION, TOGETHER WITH THE PROVISIONS FOR ITS DESIGN AND IMPROVEMENT, IS CONSISTENT WITH THE GENERAL PLAN (AS AMENDED), THE FOLSOM PLAN AREA SPECIFIC PLAN (AS AMENDED), AND ALL APPLICABLE PROVISIONS OF THE FOLSOM MUNICIPAL CODE.

J. THE SITE IS PHYSICALLY SUITABLE FOR THE TYPE OF DEVELOPMENT PROPOSED.

K. THE SITE IS PHYSICALLY SUITABLE FOR THE PROPOSED DENSITY OF THE DEVELOPMENT.

L. AS CONDITIONED, THE DESIGN OF THE SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP AND THE PROPOSED IMPROVEMENTS ARE NOT LIKELY TO CAUSE SUBSTANTIAL ENVIRONMENTAL DAMAGE OR SUBSTANTIALLY AND AVOIDABLY INJURY FISH OR WILDLIFE OR THEIR HABITAT.

M. AS CONDITIONED, THE DESIGN OF THE SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP AND THE PROPOSED IMPROVEMENTS ARE NOT LIKELY TO CAUSE SERIOUS PUBLIC HEALTH OR SAFETY PROBLEMS.

N. THE DESIGN OF THE SMALL-LOT VESTING TENTATIVE SUBDIVISION MAP AND THE TYPE OF IMPROVEMENTS WILL NOT CONFLICT WITH EASEMENTS FOR ACCESS THROUGH OR USE OF PROPERTY WITHIN THE PROPOSED SUBDIVISION.

O. SUBJECT TO SECTION 66474.4 OF THE SUBDIVISION MAP ACT, THE LAND IS NOT SUBJECT TO A CONTRACT ENTERED INTO PURSUANT TO THE CALIFORNIA LAND CONSERVATION ACT OF 1965 (COMMENCING WITH SECTION 51200 OF THE GOVERNMENT CODE).

PLANNED DEVELOPMENT PERMIT FINDINGS

P. THE PROPOSED PROJECT COMPLIES WITH THE INTENT AND PURPOSES OF CHAPTER 17.38 (PLANNED DEVELOPMENT DISTRICT) OF THE FOLSOM MUNICIPAL CODE AND OTHER APPLICABLE ORDINANCES OF THE CITY.

Q. THE PROPOSED PROJECT COMPLIES WITH THE INTENT AND PURPOSES OF THE GENERAL PLAN AND FOLSOM AREA SPECIFIC PLAN.

R. THE PROPOSED PROJECT IS CONSISTENT WITH THE OBJECTIVES, POLICIES AND REQUIREMENTS OF THE DEVELOPMENT STANDARDS OF THE CITY.

S. THE MINOR MODIFICATIONS TO EXISTING DEVELOPMENT STANDARDS PROPOSED BY THIS PROJECT WILL RESULT IN A DEVELOPMENT THAT IS SUPERIOR TO THAT OBTAINED BY RIGID APPLICATION OF THE STANDARDS.

T. THE PROPOSED PROJECT IS DESIGNED TO PROVIDE OPEN SPACE, CIRCULATION, OFF-STREET PARKING, AND OTHER CONDITIONS IN SUCH A WAY AS TO FORM A HARMONIOUS, INTEGRATED PROJECT OF SUFFICIENT QUALITY TO JUSTIFY EXCEPTIONS TO THE NORMAL REGULATIONS

U. WITH RESPECT TO PROJECT DESIGN, THE PHYSICAL, FUNCTIONAL, AND VISUAL COMPATIBILITY BETWEEN THE PROPOSED PROJECT AND EXISTING AND FUTURE ADJACENT USES AND AREA CHARACTERISTICS IS ACCEPTABLE.

V. THERE WILL BE AVAILABLE PUBLIC FACILITIES, INCLUDING BUT NOT LIMITED TO WATER, SEWER AND DRAINAGE TO ALLOW FOR THE DEVELOPMENT OF THE PROJECT SITE IN A MANNER CONSISTENT WITH THE PROPOSAL AS CONDITIONED.

W. THE PROPOSED PROJECT WILL NOT CAUSE ADVERSE ENVIRONMENTAL IMPACTS WHICH HAVE NOT BEEN MITIGATED TO AN ACCEPTABLE LEVEL

X. THE PROPOSED PROJECT WILL NOT CAUSE UNACCEPTABLE VEHICULAR TRAFFIC LEVELS ON SURROUNDING ROADWAYS AND THE PROPOSED PROJECT WILL PROVIDE ADEQUATE INTERNAL CIRCULATION INCLUDING INGRESS AND EGRESS.

Y. THE PROPOSED PROJECT WILL NOT BE DETRIMENTAL TO THE HEALTH, SAFETY, AND GENERAL WELFARE OF THE PERSONS OR PROPERTY WITHIN THE VICINITY OF THE PROJECT SITE AND THE CITY AS A WHOLE, ADEQUATE PROVISION IS MADE FOR THE FURNISHING OF SANITATION SERVICE AND EMERGENCY PUBLIC SAFETY SERVICES TO THE PROJECT.

Z. THE PROJECT IS CONSISTENT WITH THE FOLSOM PLAN AREA SPECIFIC PLAN AND FOLSOM PLAN AREA EIR/EIS. ACCORDINGLY THE PROPOSED PROJECT'S WATER DEMAND CAN BE ACCOMMODATED BY THE CITY'S EXISTING WATER SUPPLY ALLOCATED TO SERVE THE FOLSOM PLAN AREA.

INCLUSIONARY HOUSING PLAN FINDINGS

AA. THE APPLICANT HAS SATISFIED THE REQUIREMENTS OF FMC SECTION 17.104.060(F) RELATED TO THE PROVISION OF AN INCLUSIONARY HOUSING PLAN.

MINOR ADMINISTRATIVE MODIFICATION FINDINGS

BB. THE APPLICANT HAS SATISFIED THE CRITERIA FOR APPROVAL OF A MINOR ADMINISTRATIVE MODIFICATION UNDER FPASP SECTION 13.3 (ADMINISTRATIVE PROCEDURES):

- THE PROPOSED MODIFICATION IS WITHIN THE PLAN AREA.
- THE MODIFICATION DOES NOT REDUCE THE SIZE OF THE PROPOSED TOWN CENTER.
- THE MODIFICATION RETAINS COMPLIANCE WITH CITY CHARTER ARTICLE 7.08, PREVIOUSLY KNOWN AS MEASURE W.
- THE GENERAL LAND USE PATTERN REMAINS CONSISTENT WITH THE INTENT AND SPIRIT OF THE FPASP
- THE PROPOSED CHANGES DO NOT SUBSTANTIALLY ALTER THE BACKBONE INFRASTRUCTURE NETWORK.
- THE PROPOSED MODIFICATION OFFERS EQUAL OR SUPERIOR IMPROVEMENTS TO DEVELOPMENT CAPACITY OR STANDARDS.
- THE PROPOSED MODIFICATION DOES NOT INCREASE ENVIRONMENTAL IMPACTS BEYOND THOSE IDENTIFIED IN THE EIR/EIS.
- RELOCATED PARK OR SCHOOL PARCELS CONTINUE TO MEET THE STANDARDS FOR THE TYPE OF PARK OR SCHOOL PROPOSED.
- RELOCATED PARK OR SCHOOL PARCELS REMAIN WITHIN WALKING DISTANCE OF THE RESIDENTS THEY SERVE.

ATTACHMENT 2
BACKGROUND

BACKGROUND

The Folsom Plan Area Specific Plan (FPASP), approved in 2011, is a development plan for over 3,500 acres of previously undeveloped land located south of Highway 50, north of White Rock Road, east of Prairie City Road, and adjacent to the Sacramento County/El Dorado County line in the southeastern portion of the City.

The FPASP includes a mix of residential, commercial, employment and public uses, complemented by recreational amenities including a significant system of parks and open space, all within proximity to one another and interconnected by a network of "complete streets", trails and bikeways. The Specific Plan is consistent with the SACOG Blueprint Principles and the requirements of SB 375 (Sustainable Communities and Climate Protection Act).

The project site has historically been used for cattle grazing, farming, and mining activities. A farmhouse and associated barns and outbuildings are located on the north-east end of the project site. Surrounding properties are also primarily undeveloped and historically used for agriculture and livestock grazing. The project area is primarily grassland, with oak woodland dominant in the central and northwest portion of the site. Alder Creek flows north and west of the site. Single-family residential (Toll Brothers Regency) is under development to the south.

Attachment 3
Conditions of Approval

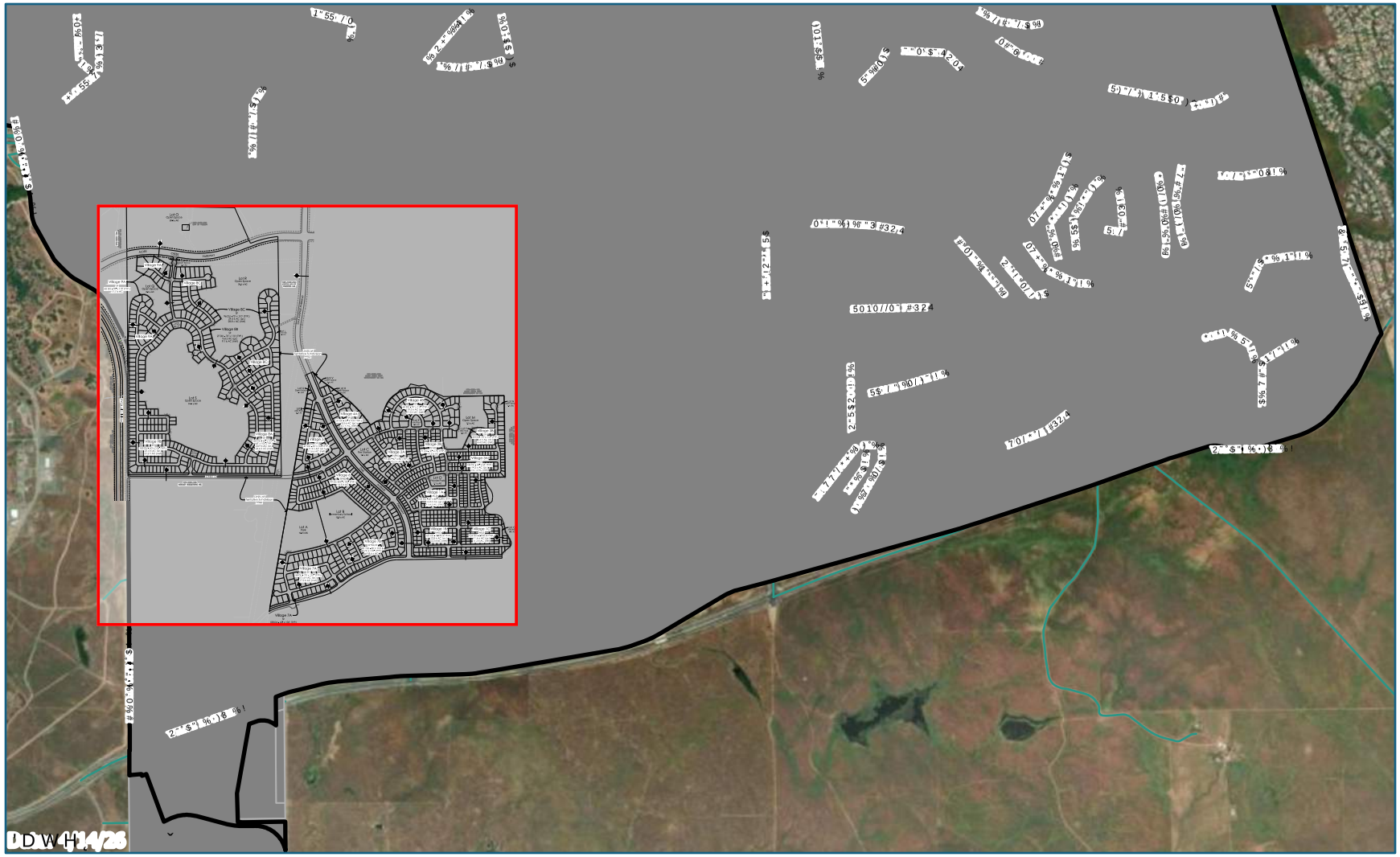
Attachment 3

Conditions of Approval

Refer to Exhibit B of Resolution No. 11643

Attachment 4

Vicinity Map



CITY OF
FOLSOM
DISTINCTIVE BY NATURE

0LOHV

Attachment 5

Small Lot Vesting Tentative Subdivision Map, dated May 13, 2026

Attachment 5

Small Lot Vesting Tentative Subdivision Map, dated May 13, 2026

(Refer to Exhibit A of Resolution No. 11643)

Attachment 6
Preliminary Grading & Storm Drain Plan, dated May 13, 2026

PRELIMINARY GRADING & STORM DRAIN PLAN

SMALL LOT VESTING TENTATIVE SUBDIVISION MAP

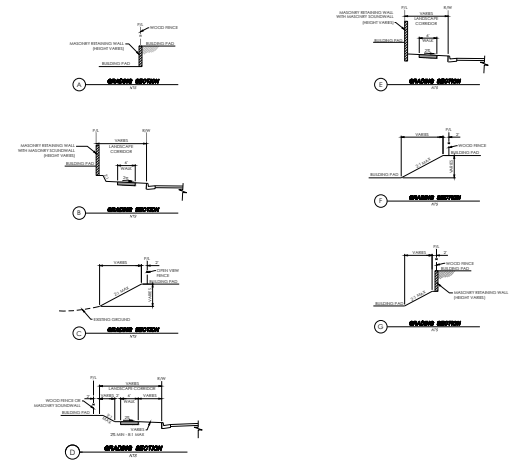
TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

MacKAY & SOMPS

May 13, 2026



LEGEND

PROPOSED	DESCRIPTION	EXISTING
	CANYON DRAIN	4" CYN
12"SD	STORM DRAIN LINE (SIZE INDICATED)	12"SD
	STORM DRAIN MANHOLE	
	JUNCTION BOX	
	DROP INLET	
	INLET/OUTLET	
	SLOPE	
0.4%	STREET GRADE	0.4%
100.00	CENTERLINE ELEVATION	100.00

N

0 50 100 200

SCALE: 1"=100'

PRELIMINARY GRADING & STORM DRAIN PLAN

VESTING TENTATIVE SUBDIVISION MAP

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

MacKAY & SOMPS

May 13, 2026

PRELIMINARY GRADING & STORM DRAIN PLAN

SMALL LOT VESTING TENTATIVE SUBDIVISION MAP

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

May 13, 2026

MacKAY & SOMPS

LEGEND

PROPOSED	DESCRIPTION	EXISTING
	CANYON DRAIN	
18"SD	STORM DRAIN LINE (SIZE INDICATED)	18"SD
	STORM DRAIN MANHOLE	
	JUNCTION BOX	
	DROP INLET	
	INLET/OUTLET	
	SLOPE	
0.4%	STREET GRADE	0.4%
103.03	CENTERLINE ELEVATION	103.03

Lot Q
Open Space
34.2 ± AC
DE

Lot P
Open Space
8.0 ± AC
DE

Lot R
Open Space
51.4 ± AC
DE

Lot K
Mod Park
4.4 ± AC

Lot L
Mod Park
3.1 ± AC

Lot S
Mod Park
4.4 ± AC

HYDRO MODIFICATION BASIN No. 3

HYDRO MODIFICATION BASIN No. 11

COMBINATION BASIN No. 1

OSLC-22

OSLC-18

ONLC-19

SEE SHEET 9

SEE SHEET 6

072-3190-006
BULLDOG OFFICE PROPERTIES LLC

072-0231-140
ALDER CREEK IMPROVEMENT CO

072-0231-141
EASTON PLACE

072-0231-142
EASTON PLACE

072-0231-145
AEROJET ROCKETDYNE INC

072-0060-090
AEROJET ROCKETDYNE INC

072-1000-078
CITY OF FOLSOM

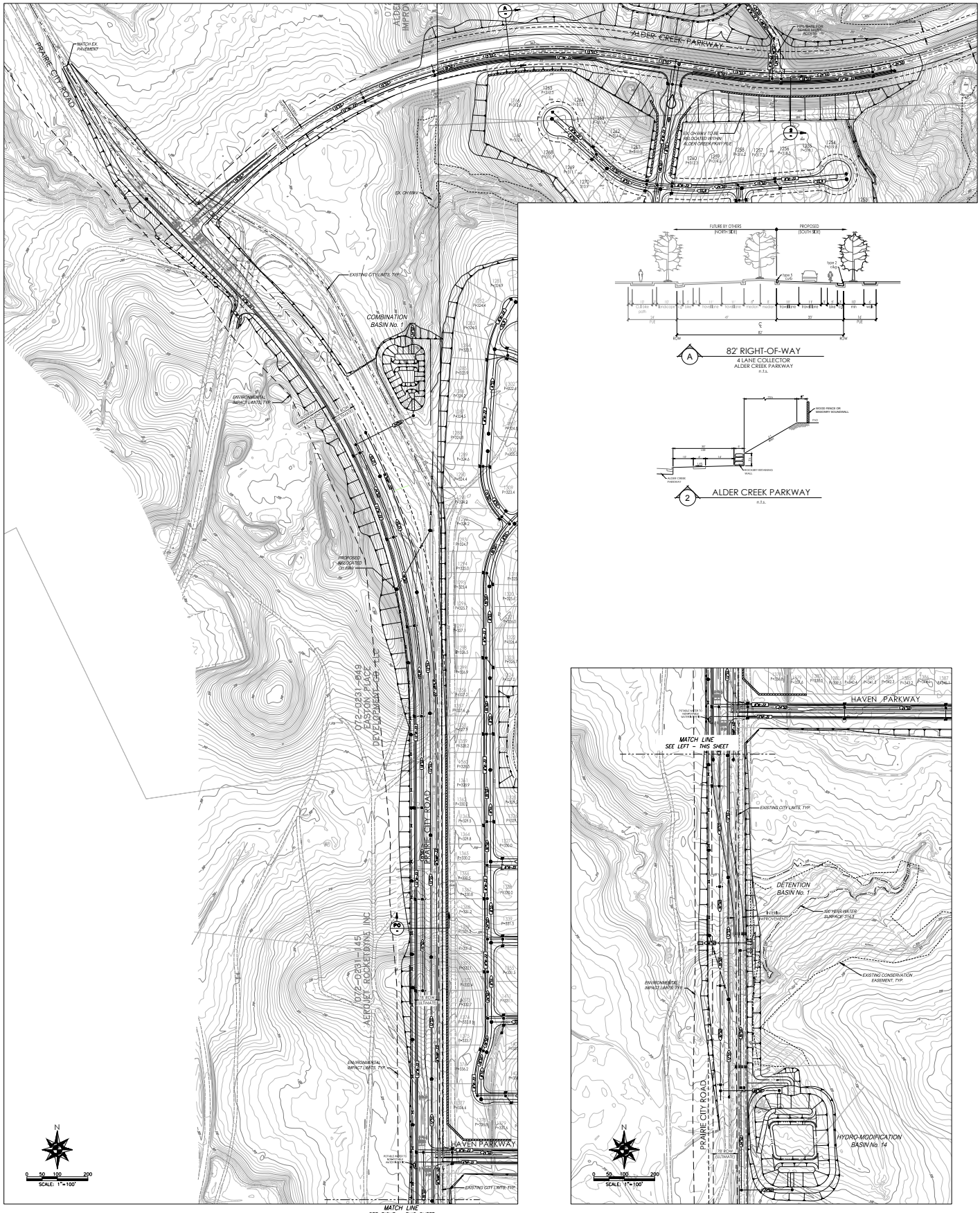
EXISTING CITY LIMITS, TYP

ENVIRONMENTAL IMPACT LIMITS, TYP

EXISTING CONSERVATION EASEMENT, TYP

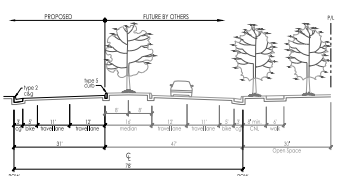
SCALE: 1"=100'

Sheet 8 of 12



A 82' RIGHT-OF-WAY
4 LANE COLLECTOR
ALDER CREEK PARKWAY
n.t.s.

2 ALDER CREEK PARKWAY
n.t.s.



PC 78' RIGHT-OF-WAY
PRAIRIE CITY ROAD
SOUTH OF ALDER CREEK PARKWAY
n.t.s.

OFFSITE INFRASTRUCTURE - PRAIRIE CITY ROAD,
COMBINATION BASIN No. 1 and HMB No. 14
SMALL LOT VESTING TENTATIVE SUBDIVISION MAP

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

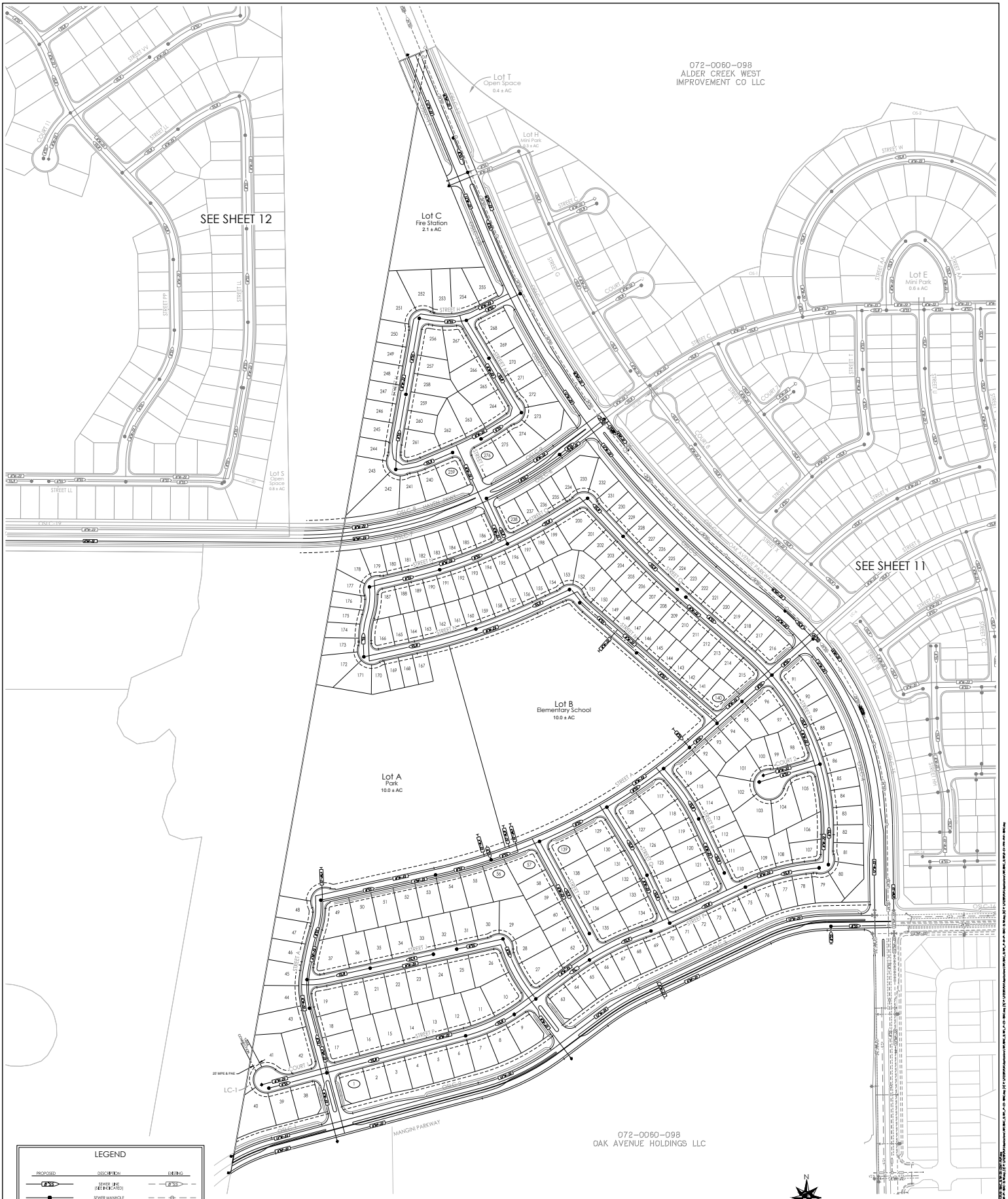
Folsom, CA

MacKAY & SOMPS CIVIL ENGINEERING PLANNING SURVEYING

May 13, 2024

Attachment 7

Preliminary Sanitary Sewer, Recycled Water & Domestic Water Plan, dated May 13, 2026



LEGEND

PROPOSED	DESCRIPTION	EXISTING
8"SS	SEWER LINE (SIZE INDICATED)	8"SS
	SEWER MANHOLE	
12"SD	STORM DRAIN LINE (SIZE INDICATED)	12"SD
	STORM DRAIN MANHOLE	
	DROP INLET	
	INLET/OUTLET	
	CDS UNIT	
12"W	WATER LINE (SIZE INDICATED)	12"W
16"W Z5	WATER LINE (SIZE AND ZONE INDICATED)	
16"NP Z5	NON POTABLE WATER LINE (SIZE AND ZONE INDICATED)	
	BLOW OFF VALVE	
	FIRE HYDRANT ASSEMBLY	

PRELIMINARY SANITARY SEWER, RECYCLED WATER & DOMESTIC WATER PLAN

SMALL LOT VESTING TENTATIVE SUBDIVISION MAP

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

MacKAY & SOMPS

May 13, 2026

TENTATIVE MAP NOTES

PROPOSED	DESCRIPTION	EXISTING
8"SS	SEWER LINE (SIZE INDICATED)	8"SS
	SEWER MANHOLE	
12"SD	STORM DRAIN LINE (SIZE INDICATED)	12"SD
	STORM DRAIN MANHOLE	
	DROP INLET	
	INLET/OUTLET	
	CDS UNIT	
12"W	WATER LINE (SIZE INDICATED)	12"W
16"W ZB	WATER LINE (SIZE AND ZONE INDICATED)	
16"NP ZB	NON POTABLE WATER LINE (SIZE AND ZONE INDICATED)	
	BLOW OFF VALVE	
	FIRE HYDRANT ASSEMBLY	

N

0 50 100 200
SCALE: 1"=100'

PRELIMINARY SANITARY SEWER, RECYCLED WATER & DOMESTIC WATER PLAN

VESTING TENTATIVE SUBDIVISION MAP

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

MacKAY & SOMPS
CIVIL ENGINEERING PLANNING SURVEYING

May 13, 2024

PRELIMINARY SANITARY SEWER, RECYCLED WATER & DOMESTIC WATER PLAN

SMALL LOT VESTING TENTATIVE SUBDIVISION MAP

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

May 13, 2026

MacKay & Somps

LEGEND

PROPOSED	DESCRIPTION	EXISTING
8"SS	SEWER LINE (SIZE INDICATED)	8"SS
	SEWER MANHOLE	
15"SD	STORM DRAIN LINE (SIZE INDICATED)	15"SD
	STORM DRAIN MANHOLE	
	DROP INLET	
	INLET/OUTLET	
	CDS UNIT	
12"W	WATER LINE (SIZE INDICATED)	12"W
16"W PZ	WATER LINE (SIZE AND ZONE INDICATED)	
16"NP PZ	NON POTABLE WATER LINE (SIZE AND ZONE INDICATED)	
	BLOW OFF VALVE	
	FIRE HYDRANT ASSEMBLY	

072-3190-006
BULLDOG OFFICE PROPERTIES LLC

072-3190-038
CITY OF FOLSOM

072-0231-140
ALDER CREEK WEST IMPROVEMENT CO LLC

072-3190-033
EASTON VALLEY HOLDINGS LLC

072-0231-049
EASTON PLACE DEVELOPMENT CO. LLC

072-0231-145
AEROJET ROCKETDYNE INC

072-0060-090
AEROJET ROCKETDYNE INC

Lot O
Open Space
30.2 ± AC
DE

Lot P
Open Space
8.0 ± AC
DE

Lot Q
Open Space
34.2 ± AC
DE

Lot R
Open Space
51.4 ± AC
DE

Lot K
Mini Park
0.4 ± AC

Lot L
Mini Park
0.4 ± AC

Lot J
Mini Park
0.3 ± AC

Lot I
Mini Park
0.3 ± AC

Lot S
Open Space
0.8 ± AC

Lot C
Fire Station
2.1 ± AC

SEE SHEET 9

SEE SHEET 9

SEE SHEET 10

OSLC-21 OSLC-22 OSLC-18 OSLC-19

COURT LL COURT MM COURT NN COURT OO COURT PP COURT QQ COURT RR COURT SS COURT TT

STREET LL STREET MM STREET NN STREET OO STREET PP STREET QQ STREET RR STREET SS STREET TT

OAK AVENUE PARKWAY

PRAIRIE CITY ROAD

HAVEN PARKWAY

EXISTING CITY LIMITS, TYP.

24' LSE/PUE

RIPE GATE FOR SEWER MAINT ACCESS

20' SANITARY SEWER EASMT

POTABLE WATER TO NON-POTABLE WATER BOOSTER

N

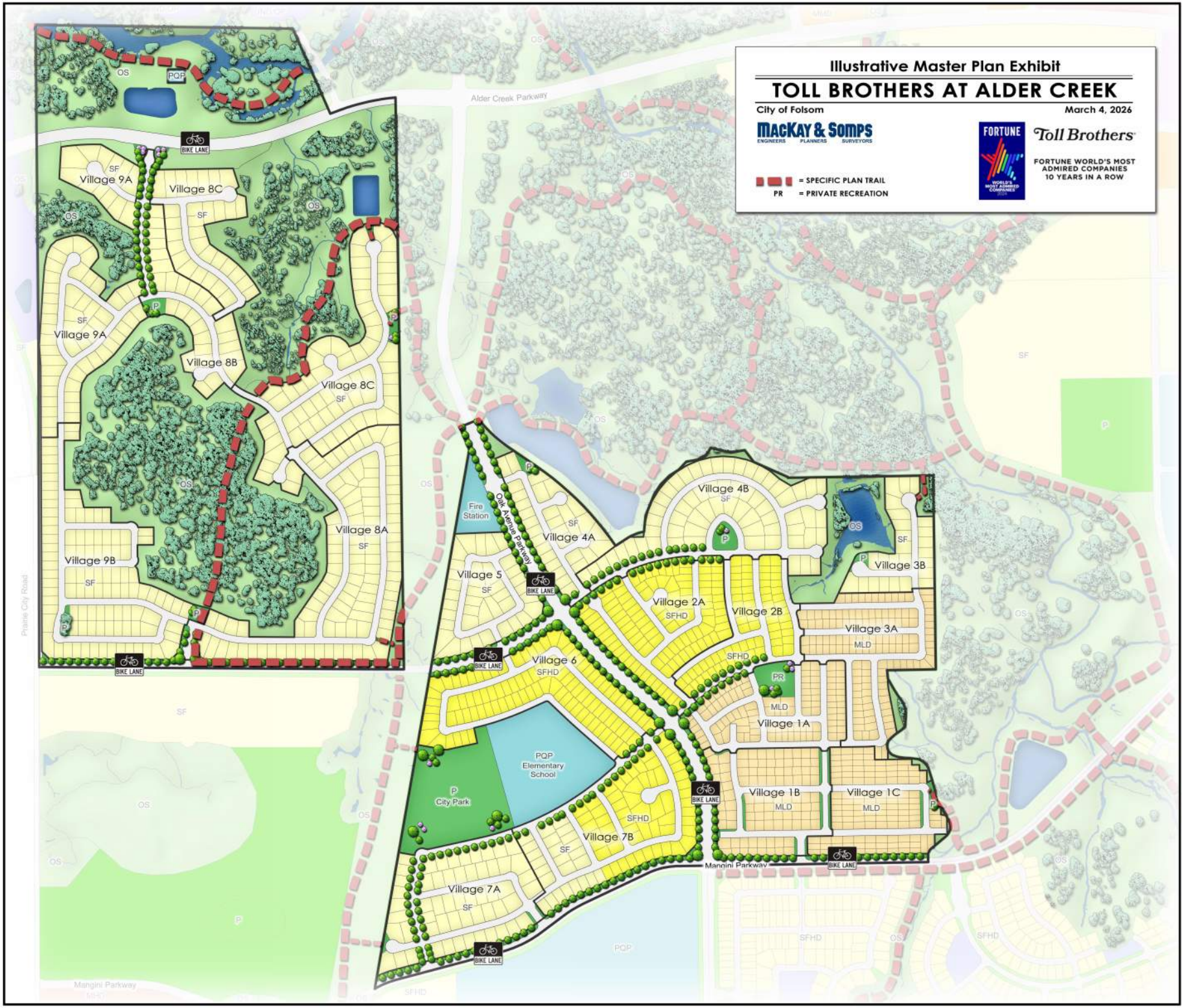
0 50 100 200
SCALE: 1"=100'

Sheet 12 of 12

Attachment 8

Illustrative Master Plan Exhibit,

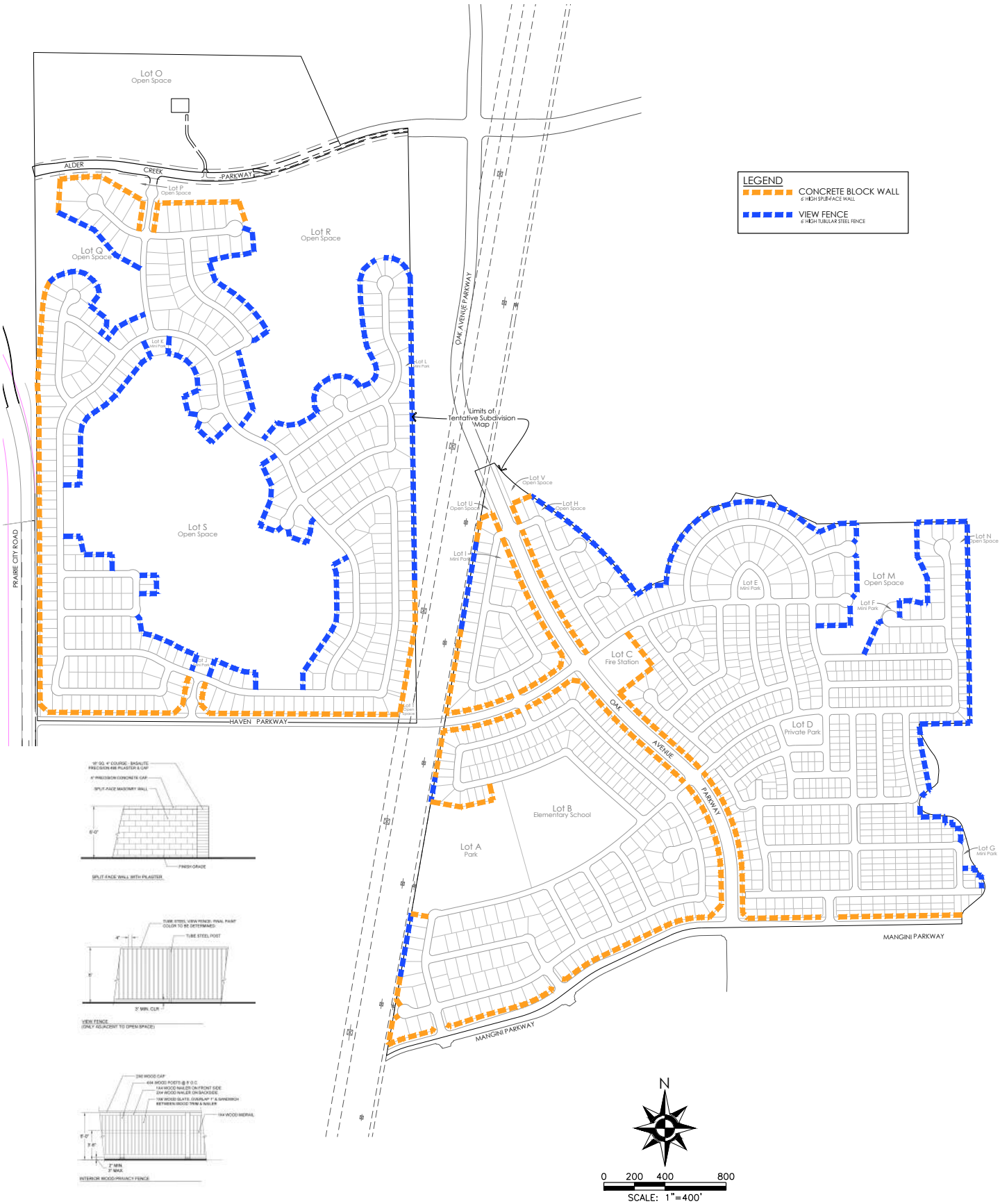
dated March 4, 2026


Illustrative Master Plan Exhibit
TOLL BROTHERS AT ALDER CREEK
City of Folsom
March 4, 2026
MacKay & Somps
ENGINEERS PLANNERS SURVEYORS
FORTUNE
Toll Brothers
FORTUNE WORLD'S MOST ADMIRED COMPANIES 10 YEARS IN A ROW
= SPECIFIC PLAN TRAIL
PR = PRIVATE RECREATION
Alder Creek Parkway
Prairie City Road
Mangini Parkway
Oak Avenue Parkway
Fire Station
Village 9A
Village 8C
Village 8B
Village 8A
Village 9B
Village 4B
Village 4A
Village 5
Village 3B
Village 2A
Village 2B
Village 3A
Village 6
Village 1A
Village 1B
Village 1C
Village 7B
Village 7A
PQP
Elementary School
City Park
BIKE LANE
OS
SF
SFHD
MLD
PR
P
PQP

Attachment 9

Perimeter Wall and Fence Exhibit,

dated November 6, 2025



CONCEPTUAL WALL AND FENCE EXHIBIT

TOLL BROTHERS at ALDER CREEK

a portion of the Folsom Plan Area Specific Plan

Folsom, CA

MacKay & Somps
ENGINEERS PLANNERS SURVEYORS

Novemeber 6, 2025

Sheet 1 of 1

27238.TOLL.ENT SUB2

DB: 45.22 sheetset P:\27238\PLN\Applications\TM\TBAC_SL\TM\S_TM-AC-SUB-101_20251107\TBAC_SL_TM-S1-Revs-FenceExhibit.dwg
[1] P:\27238\PLN\Applications\TM\TBAC_SL\TM\P-CS-TBAC.dwg [2] P:\27238\PLN\Applications\TM\TBAC_SL\TM\P-ADJ-TBAC.dwg [3] P:\27238\PLN\Applications\TM\TBAC_SL\TM\ACAD-BASE_ESMT.dwg [4] P:\27238\PLN\Applications\TM\TBAC_SL\TM\TOMERS.dwg

Attachment 10

Toll Brothers at Alder Creek Architectural Design Guidelines

Toll Brothers®

AT ALDER CREEK

ARCHITECTURAL DESIGN GUIDELINES

TABLE OF CONTENTS

Architectural Design Objectives 2
Architectural Styles 3
Product Examples 16
Development Standards 17

ARCHITECTURAL DESIGN OBJECTIVES

The intent of the Toll Brothers at Alder Creek Architectural Design Guidelines is to create interesting, attractive and pedestrian friendly neighborhoods that are compatible in character, scale and aesthetics with the overall Folsom Specific Plan. A fine grain mix of innovative housing products of varying types, sizes, forms and designs on parcels of varying sizes will help create diversity in Toll Brothers at Alder Creek. Attractive exteriors, forward architecture, thoughtful floor plans and sustainable features all contribute to an integrated design approach that offers a broad spectrum of housing choices to households of different sizes, means and preferences.

Homes in Toll Brothers at Alder Creek will be designed to integrate with the environment. It is envisioned that architecture in the lower density residential neighborhoods will be traditional to transitional in character, in keeping with the open, relaxed nature of the surroundings.

NEIGHBORHOOD CONTEXT & FUNCTION
Relate building design to the overall open space/park/paseo system and neighborhood function.

ARCHITECTURE FORWARD
Emphasize forward architecture that engages the public realm and establishes pedestrian orientation.

CHARACTER, INTEREST & QUALITY
Execute the forms, massing, details and materials to reinforce and enhance the architectural character, add interest, and demonstrate a commitment to quality.

INNOVATION & FLEXIBILITY
Provide innovative housing products that appeal to individuals and families in various life stages and means, ranging from millennials to empty-nesters to multi-generational households.

SUSTAINABILITY
Comply with the State of California Energy Code requirements and promote sustainable building practices.

ARCHITECTURAL STYLES

Residential development in Toll Brothers at Alder Creek will incorporate a mix of architectural styles to promote visual diversity and interest. Architecture will respond to local climate and take its inspiration from the design trends of various periods throughout the City's history with a focus on incorporating more contemporary architectural forms and elevations to create timeless communities. Familiar architectural styles may be abstracted and reinterpreted into forms, details, materials and colors exhibiting contemporary expressions of the referenced style, creating a clean, warm and cohesive aesthetic that appeals to modern sensibility.

Below is a list of the architectural styles selected for Toll Brothers at Alder Creek, some of which are existing in the Folsom Ranch Specific Plan:

Existing

- Spanish Colonial
- Italian Villa
- Modern Craftsman
- Modern Farmhouse
- Modern Prairie
- Modern Spanish
- Western Farmhouse

New

- Spanish Contemporary
- Coastal Contemporary
- Modern Ranch
- Modern Cottage
- Prairie

Because market conditions and homeowner preferences are continuously evolving, additional architectural styles not identified above may be introduced at Toll Brothers at Alder Creek, provided they are compatible with the surrounding neighborhoods and subject to approval by the City. The intent is to embrace eclectic diversity in architectural character and design while responding to market preferences.

COASTAL CONTEMPORARY

The Coastal Contemporary style combines the relaxed atmosphere of coastal living with sleek and modern elements or contemporary architecture. The style emerged from the demand for homes that embrace the desired qualities of coastal living while incorporating contemporary design principles. Coastal Contemporary homes often showcase open floor plans, large windows, and a mix of natural materials. They emphasize a connection with nature and often incorporate sustainable design elements. Common architectural features include hip and gable roofs, clean lines, and large windows that are used to maximize natural light. They also tend to feature outdoor living spaces such as decks and patios.

Identifying Characteristics	• Simple geometric forms with sloped roofs • Windows designed to maximize views • Earthy materials and metals that weather over time
Massing	• Simple 1 or 2 story massing • Vertical in nature • Void areas in massing as balconies/decks
Roof	• Low pitched gable and hip roofs • Shallow eaves • Tile roofing material
Windows	• Vertically proportioned windows • Grouped or in mass • Flush to exterior walls
Details	• Box bays • Balconies/decks protruding from mass
Materials	• Stone • Stucco

MODERN RANCH

The Modern Ranch style homes have a low-lying profile and horizontal building form, with minimal use of exterior and interior decoration. These homes are often accented with details borrowed from Mediterranean or Colonial styles. The Modern Ranch style is a distinctly American architectural style that originated from large ranches in the late 19th century and evolved to suit the contemporary family lifestyle. Characterized by a primary gable roof and a single-story design, the typical Ranch home is known for its long and close-to-the-ground profile, featuring minimal exterior decoration. However, Modern Ranch style homes may incorporate two-story designs and details borrowed from Mediterranean or Colonial styles, adding unique accents and enhancing the overall aesthetic appeal.

Identifying Characteristics	• Informal, asymmetrical, horizontal building form • Rustic appearance • Low-pitched roof forms • Deep overhangs • Wooden Square posts and beam covered porches
Massing	• Horizontal in nature • Simple 1 or 2 story massing, typical
Roof	• Predominantly gable roof, with shed roof; limited use of hip roofs • Flat concrete tiles, flat rustic shingle tiles, architectural grade asphalt shingles • Occasional standing seam or corrugated metal roof accents
Windows	• Square or rectilinear window shapes with divided lights • Grouped windows ribbon with continuous sill
Details	• Corbels, beams, rafter tails and diagonal kickers • Decorative black wrought iron hardware with wooden or timber detailing • Window header beams • Exposed rafters and/or fascia boards • Shutters on primary front windows
Materials	• Stucco • Stone as wall mass or accent • Brick or siding elements

PRAIRIE

The Prairie style, developed by Frank Lloyd Wright, gained significant popularity during the early 1900s. Wright's philosophy emphasized that a building should fulfill its primary function while reflecting character, life, spirit, and beauty. These principles became increasingly influential as the Prairie style spread throughout the country. One of the key characteristics of Prairie design is its emphasis on horizontal massing, which complements the surrounding landscape and creates a sense of unity between the building and its environment. Clean lines are also a hallmark of the Prairie style, focusing on simplicity and functionality. These elements, combined with Wright's vision for harmonious and organic architecture, have contributed to the lasting influence and appeal of the Prairie style.

Identifying Characteristics	• Horizontal massing and clean lines • Low pitched hip roofs • Details emphasizing horizontal line
Massing	• Strong horizontal building form • 1 or 2 story massing
Roof	• Low pitched hip roof or flat horizontal roofs • Typical 3:12 to 4:12 roof pitch • 12" to 24" overhangs • Flat concrete tile
Windows	• Square or rectangular window shapes • Horizontal window grouping • 1" minimum window recess • Trim used to unify window bands
Details	• Stucco square porch columns • Contrasting wall materials or trims emphasizing horizontality
Materials	• Stucco • Drystacked stone

MODERN COTTAGE

The Cottage architectural style is inspired by the charming, picturesque homes found in European countryside villages, particularly in England and France. It gained popularity in the United States during the early 20th century, influenced by the Arts and Crafts movement, which emphasized handcrafted details and natural materials. The style evokes a cozy, inviting aesthetic with its asymmetrical forms, steeply pitched roofs, and quaint detailing. Cottage homes are often smaller in scale but rich in character, featuring storybook-like elements such as dormer windows. The style embraces an eclectic mix of materials and textures, creating a warm and welcoming atmosphere.

Identifying Characteristics	• Blending sleek, clean lines of contemporary design with farmhouse charm • Airy connections to outdoors • Neutral colors and combinations of materials and textures to create interest
Massing	• Simple 1 or 2 story massing
Roof	• Medium to steep gable roofs • Low pitched roof at porch
Windows	• Predominantly vertically proportioned windows • Horizontal or square window accents • Larger masses of windows
Details	• Entry porches • Smooth finished wooden posts • Wood or metal railing • Trim elements emphasizing vertical orientation
Materials	• Stucco • Horizontal or vertical siding • Siding, corrugated metal or brick veneer

SPANISH CONTEMPORARY

Spanish Contemporary architecture is a style characterized by stucco walls, low-pitched tile roofs and asymmetrical facades, drawing inspiration from Spanish Colonial architecture, often featuring elements like courtyards, wooden doors with intricate carvings, and small windows with deep reveals. The design features a streamlined and minimalist approach while incorporating modern materials and updates; still maintaining the classic Spanish style elements.

Identifying Characteristics	• Contemporary interpretation of traditional Spanish Colonial architecture • "S" tile roofs and/or flat roofs • Simple, bold walls with recessive detailing • Unadorned arch form
Massing	• Simple building form & 1 or 2 story with rectangular or cubic building masses
Roof	• Predominantly gable and shed roofs • Low pitch roof with faux flat roof using a parapet configuration • Tight eaves and 0" rake • Shallow sloped, concrete "S" tiles and flat roof tiles
Windows	• Square, rectangular and simplified arched window shapes • 1" minimum window recess • Recessed feature window
Elements/Details	• Ground-level arch element on front elevation • Decorative metal lanterns, scones or railings • Optional exposed truss tails
Materials	• Stucco • Wood-look tile

MODERN FARMHOUSE

Blending traditional farmhouse forms and features with a more modern variety of materials, details and compositions, the Modern Farmhouse style was created to bring a more contemporary expression to a customarily rural aesthetic. This progressive approach to home design takes time-honored architectural characteristics and updates them with an eclectic and modern feel. This style combines the use of a traditionally massed farmhouse gable-end shape with modern exterior materials such as stucco, board and batten and textured stone. Exterior colors seek a balance of crisp white and grey accents with natural tones and materials. This style strikes a balance between traditional elements and modern textures to provide a familiar sense while mixing in forward-looking design and quality.

Identifying Characteristics	• Sleek, clean geometric forms and asymmetrical massing • Airy connections to outdoors • Neutral colors and combinations of materials and textures to create interest
Massing	• Simple 1 or 2 story massing
Roof	• Medium to steep gable roofs • Low pitched roof at porch • Metal accents
Windows	• Predominantly vertically proportioned windows • Horizontal or square window accents • Larger masses of windows
Details	• Entry porches • Metal posts, smooth finished wooden posts • Wood or metal railing • Trim elements emphasizing vertical orientation
Materials	• Stucco • Horizontal or vertical siding • Siding, dry stacked stone accents

MODERN CRAFTSMAN

The Modern Craftsman style is a fresh take on the traditional architectural style common to the early 20th century development of California. Striking and iconic in nature, the style artfully merges streamlined forms, bold roof lines, stunning glass and details with subtle textures. Balanced, asymmetrical masses and deep roof overhangs are essential for executing this style properly. Recessed and corner window compositions with wood tile accents are strongly encouraged as they add drama to the Modern Craftsman's inherent simplicity. The material palette is comprised predominantly of stucco, with accents of clean stone textures and rich wood tile. Stucco body colors should be light and tonal, allowing for contrasting fascia and eyebrow roofs. Overall, the Modern Craftsman style is sophisticated and contemporary without being sterile.

Identifying Characteristics	• Grounded building mass • One-story roof volumes commonly used • Broad horizontal building features • Trellis elements and wide-sweep front porch • Masonry porch supports • Tapered square composite wood posts
Massing	• Simple 1-2 story massing
Roof	• Predominantly gable roof, with shed roof over porches or secondary masses • Shed or pitched dormers • Architectural grade asphalt shingles; flat, rustic shingle tiles
Windows	• Square or rectilinear window shapes with divided lights • Window grouping of two or three • Horizontal ribbon of vertically proportioned windows
Details	• Wood posts, kickers, beams, rafter tails • Simplified wood window and door trims • Carpenter/crafted detailing • "Arts & Crafts" lighting fixtures • Porch railing
Materials	• Medium sand finish stucco, or in combination with stone wainscot base • Variety of siding textures • Stone facades • Woodstone tile accents

ITALIAN VILLA

The Italian Villa was one of the most fashionable architectural styles in the United States in the 1860's. Appearing on architect-designed landmarks in larger cities, the style was based on formal and rigidly symmetrical palaces of the Italian Renaissance. Although residential adaptations generated less formality, traditional classical elements, such as the symmetrical façade and squared tower entry forms persisted as the enduring trails of this style. With the emergence of French limestone as a popular building material, it became an integral part of the Italianate vocabulary, embellishing homes with a strong presence at key locations of the home.

Identifying Characteristics	• Hipped roof with flat symmetrical facade • Full-width loggia with formal and elegant detailed colonnade
Massing	• 1-2 story massing
Roof	• Hipped roof, low pitched • Enclosed flat eave overhangs and cornice accents • Barrel or S-shaped concrete tiles
Windows	• Formal window arrangement across facade • Symmetrical placement of windows • Decorative trim
Details	• Simple trims; shutters for accents • Large scale stone accents to highlight prominent massing elements
Materials	• Stucco • Limestone accents

SPANISH COLONIAL

The Spanish Colonial architectural style gained popularity in the 1920s and early 1930s, evolving primarily in California and the southwestern United States. It blends elements of Mission Revival with influences from Latin American architecture and remains a widely recognized style in California, Arizona, Texas, and Florida. Designed to complement the California lifestyle, it features signature elements such as open courtyards, red tile roofs, and stucco exteriors, contributing to its timeless appeal.

Identifying Characteristics	• "S" tile roofs • Recessed entry or feature window on front elevation • Decorative metal railing, gable roof end details
Massing	• Asymmetrical, one and two-story simple building masses
Roof	• Gable or hip roofs; shed roof over porch • Typical 4:12 to 5:12 roof pitch • 0" to 12" overhang with tight rakes on gable roof ends • Shallow sloped, concrete "S" tiles in variegated colors (predominantly red)
Windows	• Rectangular or square window shapes • 1" minimum window recess • Simple window trim; entry stucco or precast surround
Details	• Ground-level arch elements on front elevation • Stucco eave and trim details • Exposed truss tails with simple decorative cut • Gable roof end vents with concrete pipe details or recessed faux vents
Materials	• Stucco

MODERN PRAIRIE

Roofs are a lower hip on hip design with flat concrete roof tiles. These roofs contribute to grounded massing approach highlighted with vertically oriented feature windows. Elevation features are further highlighted with material transitions and color application. Windows kept intentionally without grids and masonry stone veneer styles are the most rectilinear and crisp for differentiation.

Identifying Characteristics	• Asymmetrical, contemporary cottage look • Practical and picturesque prairie home
Massing	• 2 story massing
Roof	• Flat concrete tile • Gently pitched roofs
Materials	• Stucco • Stone veneer • Lap siding

MODERN SPANISH

Based on simple early Spanish missions, the style uses minimal decorative details borrowed from Spanish Revival homes that are most common in southwestern states, particularly California, Arizona and Texas. Identifying features are low-pitched roofs, with little to no overhang, and tile roof covering. Recessed elements along with gable end details and trims; wall surface is usually stucco; facade normally asymmetrical. Decorative tile provides accents.

Identifying Characteristics	• Simply articulated details and adaptability
Massing	• 2 story massing
Roof	• Villa shaped concrete tiles • Gently pitched
Windows	• Recessed
Details	• Gables
Materials	• Stucco

WESTERN FARMHOUSE

The Farmhouse style dates back to 19th century America and encompasses a range of variations as it reflects local geography and climate. Throughout America the many examples of Farmhouse represent the key concept of a functional home that effortlessly combines informal and formal spaces. This style is defined by simple detailed, understated, and utilitarian features that reflect the concept of a simple agrarian lifestyle. Homes in this style are often simple in massing and can include a covered porch element, gable roof forms, and porch columns and posts.

Identifying Characteristics	• Asymmetrical casual cottage look • Practical and picturesque country home
Massing	• 2 story massing
Roof	• Flat concrete tile • Steeper pitched roofs
Materials	• Stucco • Brick veneer • Lap siding

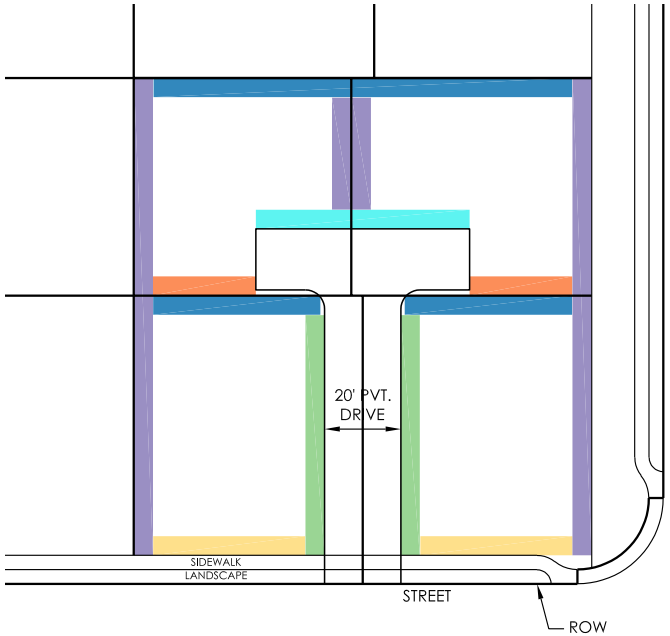
The images below are from a Toll Brothers project with the same kind of proposed Land Use in Lake Forest, CA. The streetscape was developed to carefully consider the use of street trees and park strips to provide extra natural relief from building forms. The use of two street-facing homes helps the community feel like a traditional single-family development, while promoting high density product and affordability.

4-PACK PRODUCT EXAMPLES

DEVELOPMENT STANDARDS	
DEVELOPMENT STANDARD	4-PACK PRODUCT
Lot Size	
Motor Court Lot	3,000 SF Min.
Street Facing Lot	3,000 SF Min.
Building Coverage	
Motor Court Lot	60 % Max.
Street Facing Lot	60% Max.
Minimum Front Yard Setbacks	
To street garage	18 Ft. Min.
To motor court garage from PL	18 Ft. Min
Front yard (street side) setback in yellow	10 Ft. Min.
Front yard (drive side) setback in sky blue	2 Ft. Min
Side yard (drive side) setback in green	2 Ft. Min.
Side yard setback in purple	5 Ft. Min.
Side yard setback in orange	0 Ft. Min.
Side yard setback in blue	8 Ft. Min.

Notes:

1. For zero-lot-line dwelling units: 0 feet side yard setback for one side; 10 feet side yard setback for the other side.



4-PACK

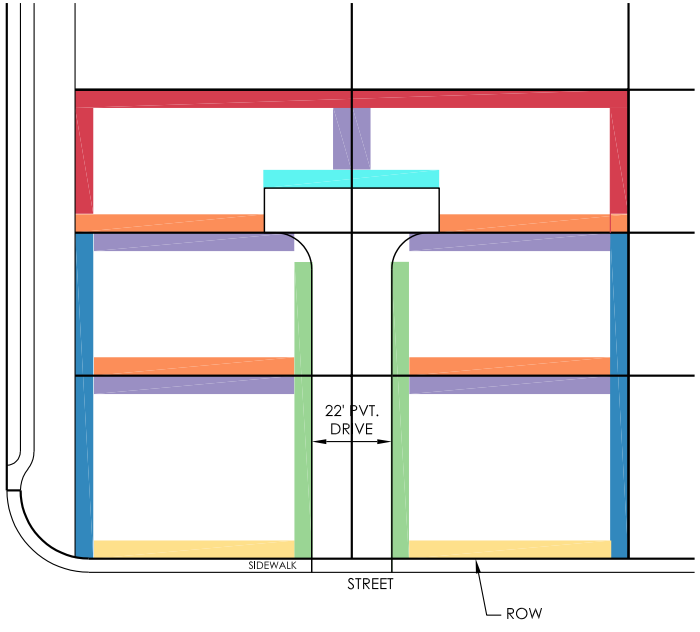
MIN. LOT SIZE: 3000sf
MAX COVERAGE: 60%

	FRONT YARD (STREET SIDE) SETBACK:	10' MIN.
	FRONT YARD (DRIVE SIDE) SETBACK:	2' MIN.
	SIDE YARD (DRIVE SIDE) SETBACK:	2' MIN.
	SIDE YARD SETBACK:	5' MIN.
	SIDE YARD SETBACK:	0' MIN.
	REAR YARD SETBACK:	8' MIN.

DEVELOPMENT STANDARDS	
DEVELOPMENT STANDARD	6-PACK PRODUCT
Lot Size	
Motor Court Lot	2,800 SF Min.
Building Coverage	
Motor Court Lot	65% Max.
Minimum Front Yard Setbacks	
Front yard (drive side) setback in green	5 Ft. Min.
Side yard (street side) setback in yellow	10 Ft. Min.
Side yard setback in purple	8 Ft. Min.
Side yard setback in sky blue	4 Ft. Min.
Side yard setback in orange	0 Ft. Min.
Side yard setback in red	5 Ft. Min
Rear yard setback in blue	10 Ft. Min.

Notes:

1. For zero-lot-line dwelling units: 0 feet side yard setback for one side; 10 feet side yard setback for the other side.



6-PACK

MIN. LOT SIZE: 2800sf
MAX COVERAGE: 65%

FRONT YARD (DRIVE SIDE) SETBACK:	5' MIN.
SIDE YARD (STREET SIDE) SETBACK:	10' MIN.
SIDE YARD SETBACK:	8' MIN.
SIDE YARD SETBACK:	4' MIN.
SIDE YARD SETBACK:	0' MIN.
SIDE YARD/REAR YARD SETBACK:	5' MIN.
REAR YARD SETBACK:	10' MIN.

DEVELOPMENT STANDARDS

DEVELOPMENT STANDARD	SINGLE FAMILY RESIDENTIAL (SFD)	SINGLE FAMILY HIGH DENSITY (SP-SFHD)	MULTI FAMILY LOW DENSITY (SP-MLD)	
			SINGLE FAMILY DWELLING UNITS	TWO FAMILY DWELLING UNITS
Lot Size				
Interior Lot	6,000 SF Min.	3,525 SF Min.	2,925 SF Min.	5,460 SF. Min.
Corner Lot	7,500 SF Min.	4,000 SF Min.	3,000 SF. Min.	6,000 SF. Min.
Building Coverage				
Interior Lot	45% Max.	50% Max.	50% Max.	50% Max.
Corner Lot	45% Max.	50% Max.	50% Max.	50% Max.
Width (Measured at front yard setback)				
Interior Lot	60 Ft. Min.	40 Ft. Min	30 Ft. Min.	60 Ft. Min.
Corner Lot	75 Ft. Min.	45 Ft. Min.	35 Ft. Min.	65 Ft. Min.
Cul-de-sac	45 Ft. Min.	35 Ft. Min.	--	--
Flag lot	60 Ft. Min.	40 Ft. Min.	--	--
Setbacks (Measured at the back of sidewalk)				
Front Yard Setbacks				
Courtyard / Porch (measured at foundation line)	15 Ft. Min. 50% Frontage; 20 Ft. Min. Remainder	12.5 Ft. Min.	12.5 Ft. Min	12.5 Ft. Min.
Primary Structure	15 Ft. Min. 50% Frontage; 20 Ft. Min. Remainder	15 Ft. Min.	15 Ft. Min	15 Ft. Min.
Garage	20 Ft. Min.	20 Ft. Min.	20 Ft. Min.	20 Ft. Min.
Side Yard Setbacks				
Interior Side Yard[2]	5 Ft. Min., 10 Ft. Min. Between Buildings	5 Ft. Min.; 10 Ft. Minimum Between Buildings	5 Ft. Min.[2]	5 Ft. Min.[2]

DEVELOPMENT STANDARDS

DEVELOPMENT STANDARD	SINGLE FAMILY RESIDENTIAL (SFD)	SINGLE FAMILY HIGH DENSITY (SP-SFHD)	MULTI FAMILY LOW DENSITY (SP-MLD)	
			SINGLE FAMILY DWELLING UNITS	TWO FAMILY DWELLING UNITS
Street Side Yard (corner lot)	15 Ft. Min. 50% Frontage; 20 Ft. Min Remainder	15 Ft. Min.	12.5 Ft. Min.	12.5 Ft. Min.
Garage Facing Side Street (corner lot)	20 Ft. Min.	20 Ft. Min	20 Ft. Min.	20 Ft. Min.
Second Dwelling Unit[1] [2]	5 Ft. Min.	5 Ft. Min.	--	--
Accessory Structures (interior lot lines)	5 Ft. Min.	5 Ft. Min.	3 Ft. Min.	3 Ft. Min.
Rear Yard Setbacks				
Main Building	20 Ft. Min	15 Ft. Min.	10 Ft. Min.	10 Ft. Min.
Second Dwelling Unit[1]	5 Ft. Min.	5 Ft. Min.	--	--
Accessory Structure	5 Ft. Min.	5 Ft. Min.	5 Ft. Min.	5 Ft. Min.
Detached Garage	5 Ft. Min.	5 Ft. Min.	5 Ft. Min.	5 Ft. Min.
Building Height				
Main Building	35 Ft. Max.	35 Ft. Max.	35 Ft. Max.	35 Ft. Max.
Detached Garage	18 Ft. Max.	18 Ft. Max.	18 Ft. Max.	18 Ft. Max.
Second Dwelling Unit[1]	18 Ft. Max.	18 Ft. Max.	--	--
Accessory Building	15 Ft. Max.	15 Ft. Max.	15 Ft. Max.	15 Ft. Max.

Notes:

1. If second dwelling unit placed above detached garage, then max. height increased to 22 feet and side and rear yard setbacks for both detached garage and second unit increased to 13 feet.

Attachment 11

Toll Brothers at Alder Creek Landscape Design Guidelines

TOLL BROTHERS AT ALDER CREEK

LANDSCAPE DESIGN GUIDELINES

March 27, 2026

Toll Brothers®

SMP ENVIRONMENTAL DESIGN

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ALDER CREEK LANDSCAPE SETTING

Alder Creek is situated within the Folsom Ranch Specific Plan (FRSP) area, in the city of Folsom, approximately 20 miles east of Sacramento in the foothills of the Sierra Nevada Mountains. As part of this larger master-planned development, Alder Creek plays a key role in fulfilling Folsom Ranch's vision for a balanced integration of residential neighborhoods, open spaces, and natural preservation.

The land features rolling topography of oak woodlands and grasslands historically used for cattle grazing, as well as the Alder Creek watershed and its riparian hardwood tributaries. The open space corridors within Alder Creek align with FRSP's objectives of maintaining natural landforms, promoting ecological connectivity, and enhancing recreational opportunities. The diverse natural setting that surrounds and weaves through in the form of open space, provides inspiration and theming for this community and its amenities.

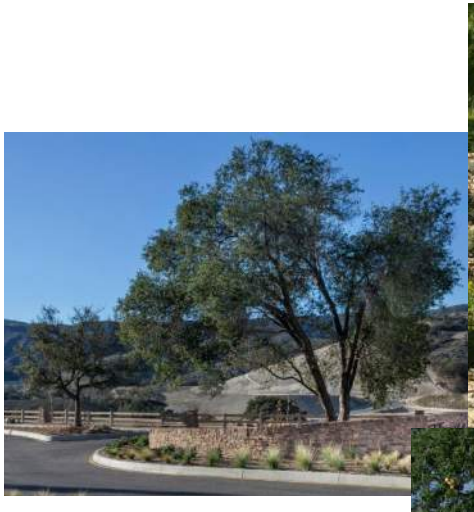
The project area is bound by Alder Creek to the north, Prairie City Road to the west, and Mangini Parkway to the south. Oak Avenue Parkway bisects the southern planned area of homes and is the primary drive through the community of homes and open space to the west and east. All together this community provides a dramatic and iconic California setting for all who live and visit this area.

DESIGN CONCEPT

Community identification is the signature, the defining characteristics that give the community its personality. This personality starts with its setting. Alder Creek's landscape design concept is a seamless extension of the Folsom Ranch Specific Plan's vision, emphasizing the integration of natural beauty, community identity, and sustainable planning. As previously described, our setting provides the opportunity to reinforce the most dramatic features of our surrounding classic California scenery. Incorporating large native trees and similar large specimen trees will be used in key locations throughout the site whenever possible, as if the community was built around them in reverence to their signature value. California sycamores and pines will accentuate natural creeks and hillsides, reinforcing Folsom Ranch's commitment to ecological preservation.

Stylized mounding and mass regional planting will reinforce the hilly terrain and strengthen the drama of our setting. Hardscape elements will utilize stone, wood, and steel to celebrate the area's rich heritage of ranching and farming. These materials will be designed in contemporary forms demonstrating our reverence for the true grit of our California heritage forged into our modern contemporary life. Walkways will meander where appropriate to celebrate the creeks and hills which punctuate our site. All these elements, working together, will help provide a sense of place while contributing to the large identity of Folsom Ranch.

STREET LANDSCAPE THEMING

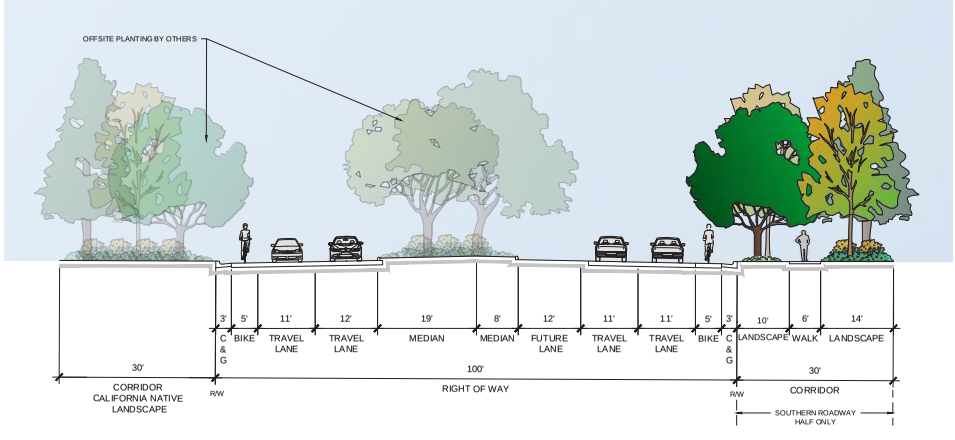


Alder Creek's streetscapes are designed to maintain community within Folsom Ranch's broader landscape and mobility framework. The development is surrounded by four major arterial streets that are consistent with FRSP's goal of creating scenic corridors, pedestrian-friendly environments, and muti-model transportation networks.

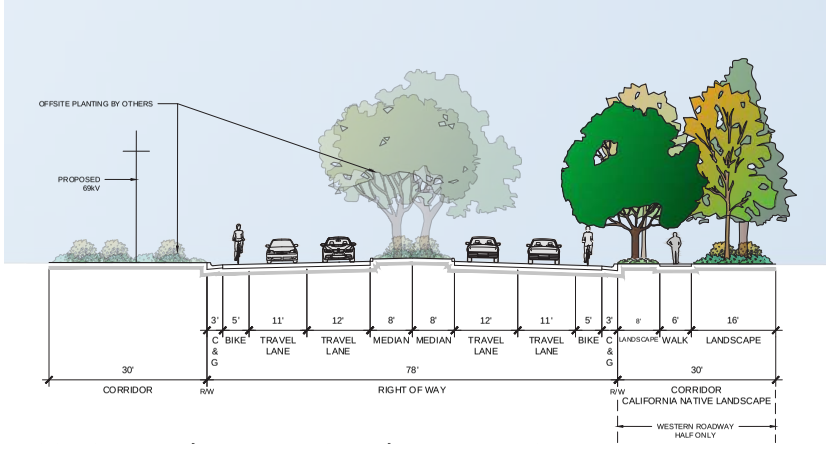
Key arterials have generous setbacks and medians to allow the neighborhoods here to be nestled within scenic corridors of walkways meandering through oaks, sycamores, camphors, and pines. The vision is essentially to embrace the community at large with a harmonious wooded zone that glorifies the oak woodland and alder creek environment which surrounds and flows through it. Round-a-bouts, street edges, and key intersections will provide opportunities to use large native trees to weave these thoroughfares amongst the natural oak woodland setting.

Rather than to have each surrounding street look different, instead, regardless from which direction you enter, you will experience the same signature sense of place that defines Alder Creek and its respect for the sizeable open space around it.

STREET SECTIONS

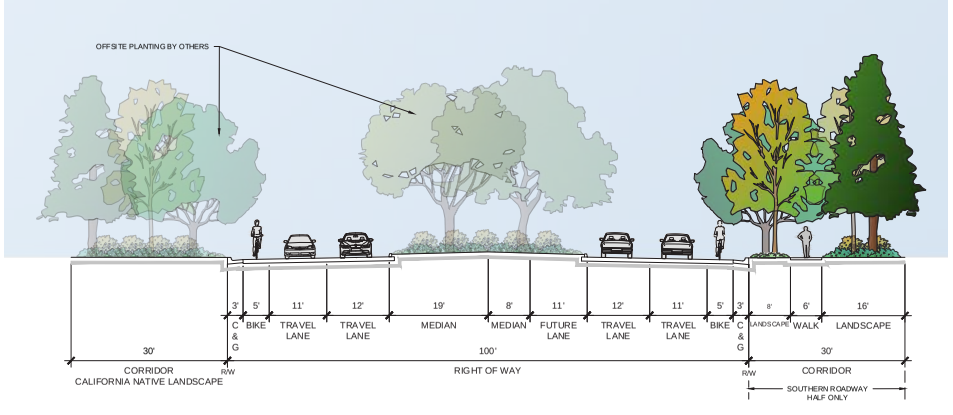


ALDER CREEK PARKWAY | 4 LANE ARTERIAL

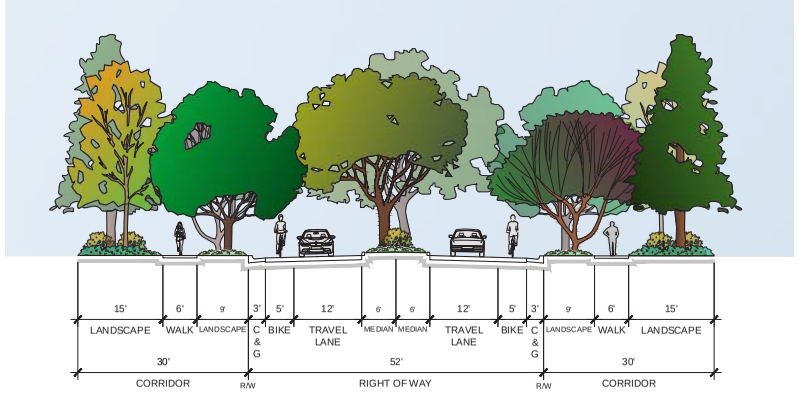


PRAIRIE CITY ROAD | 4 LANE ARTERIAL

*SUBJECT TO FUTURE MODIFICATIONS IN ACCORDANCE WITH CITY GUIDANCE

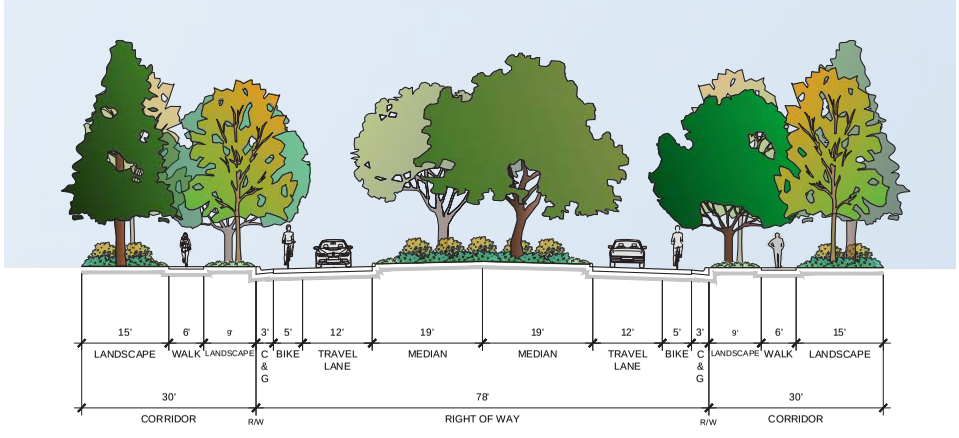


ALDER CREEK PARKWAY | 4 LANE ARTERIAL

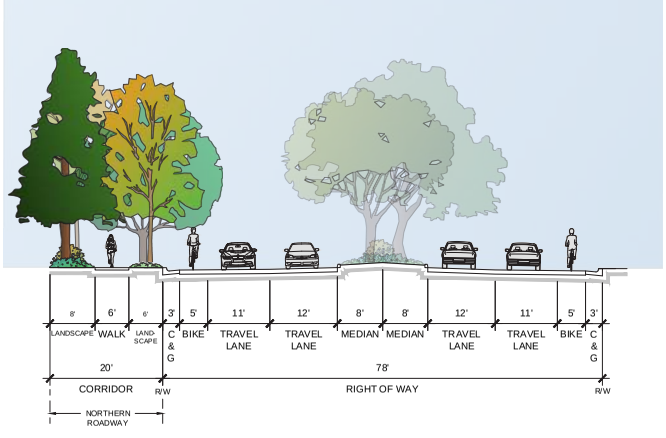


STREET 'D' | 2 LANE COLLECTOR

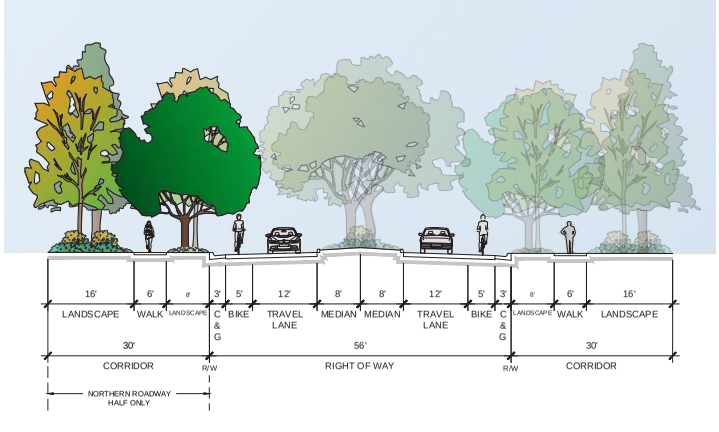
STREET SECTIONS



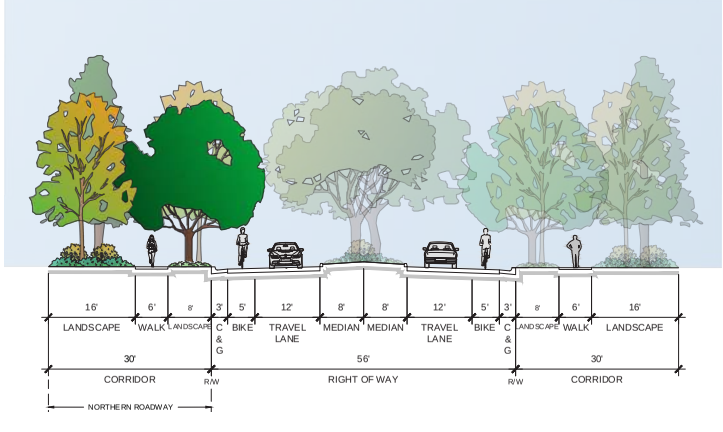
OAK AVENUE PARKWAY | 4 LANE ARTERIAL



MANGINI PARKWAY | 4 LANE ARTERIAL



MANGINI PARKWAY | 2 LANE COLLECTOR



MANGINI PARKWAY | 2 LANE COLLECTOR

MASTER PLANT LIST

Trees

Arbutus marina – Marina Strawberry Tree
Cercis occidentalis – Western Redbud
Cinnamomum camphora – Camphor Tree
Dodonaea viscosa 'purpurea' – Purple Hopseed
Ginkgo biloba 'Golden Colonnade' – Golden Colonnade Gingko
Ginkgo biloba 'Princeton Sentry' - Princeton Sentry Gingko
Lagerstroemia spp. – Crape Myrtle
Pinus eldarica – Mondell Pine
Pistacia chinesis _ Red Pushe Pistache
Platanus acerifolia 'Bloodgood' – London Plane Tree
Platanus acerifolia 'Colombia' – London Plane Tree
Prunus caroliniana 'compacta' – Cherry Laurel
Prunus cerasifera – Purple Leaf Plum
Podocarpus macrophyllus 'Maki' – Maki Chinese Podocarpus
Quercus agrifolia – Coast Live Oak
Quercus ilex – Holly Oak
Rhus lancea – African Sumac
Schinus molle – California Pepper Tree
Washingtonia filifera - California Palm (Recreation Amenity Only)

Shrubs

Agave spp. - Agave
Abelia spp. – Abelia
Aloe striata hyb. – Ghost Aloe
Aloe vera - Aloe
Arbutus unedo 'compacta' – Compact Strawberry Tree
Arbutus unedo 'Elfin King' – Elfin King Strawberry
Berberis spp. - Barberry
Buxus microphylla japonicum 'green beauty – Japanese Boxwood
Carex divulsa – Grey Sedge
Callistemon viminalis 'Little John' – Little John Bottlebrush
Dietes spp. – African Iris
Elaeagnus pungens – Silverthorn

Shrubs Continued

Escallonia fradesii – Pink Princess Escallonia
Euonymus fortunei 'Emerald Gaiety' – Emerald Gaiety Wintercreeper
Euonymus fortunei 'Coloratus' – Purple Wintercreeper
Euonymus japonicus – Japanese Spindle
Hesperaloe spp. - Hesperaloe
Heteromeles arbutifolia – Toyon
Juniperus spp. – Juniper
Ligustrum japonicum – Waxleaf Privet
Leucophyllum frutescens – Texas Sage
Myoporum parvifolium – Fine Leaf Myoporum
Photinia fraseri – Red Tip Photinia
Pittosporum tobira spp. – Japanese Pittosporum
Prunus caroliniana 'Compacta' – Compact Carolina Cherry Laurel
Rhamnus californica spp. – Coffeeberry
Rhaphiolepis indica 'Ballerina' – Ballerina Indian Hawthorn
Rosa spp. – Rose
Rhaphiolepis indica – Indian Hawthorn
Rhus ovata – Sugar Bush
Teucrium chamaedrys - Germander
Trachelospermum asiaticum – Asian Star Jasmine
Westringia fruticans 'Morning Light' – Coast Rosemary
Xylosma congestum – Shiny Xylosma

DESIGN VISION

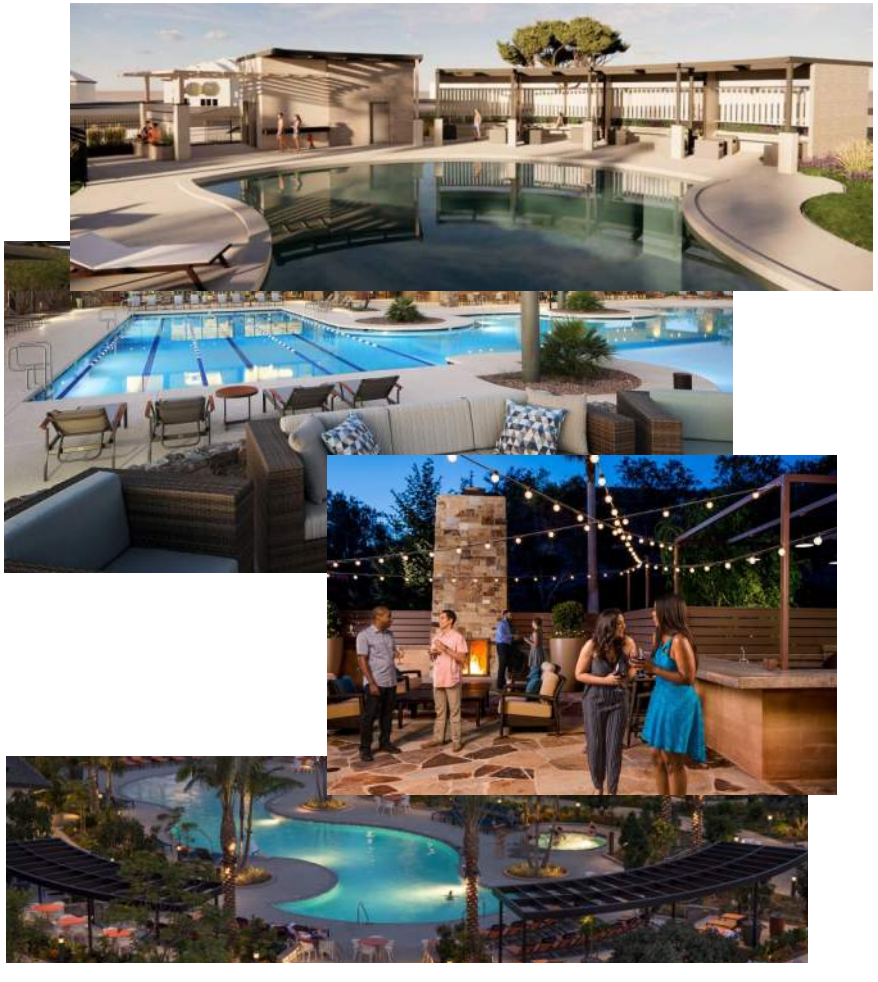
A well-designed and thoughtfully implemented landscape is central to achieving the visual and design aesthetic envisioned for Alder Creek. The site's distinct natural topographical features and vegetation, complimented by its historical ranch heritage and rural character, serves as the foundation for its amenity designs. These elements combined with the needs and desires of contemporary living, provide us with the elements for the amenity designs to take shape. The landscape vision is realized in the forms and materials of walls, fences, signs, structures, and paving. It is reflected in the trees, shrubs, and mounded landforms; and it is activated in the functions designed to provide for the comfort, relaxation, recreation, and style in our everyday lives.

RECREATION / PRIVATE PARK AMENITY

The recreation center will focus on contemporary amenities for poolside entertainment and relaxation. A 1.1 acre size facility will cater to both active recreation and leisure, including:

- 3,200 sf of lap pool, play pool, splash pool, and separate spa
- BBQ center, bar, & fireplace
- 2,000 sf of shade structures
- 13,000 sf of deck lounge
- 1,400 sf of restrooms & pool equipment
- 33,000 sf of landscape and handicap parking

This private park location provides ample room for the preceding recreational amenities while also allowing an equal amount of space for landscaping to soften, buffer, and even provide ample turf, lounge, and play space. The facility design will emphasize the need to separate exercise lap pool activity from family play pool activities, as well as separating a more private space for spa users. Opportunities will be provided for ample shade lounging as well as sun lounging space. The BBQ center, bar, and fireplace area allows for family and group parties to stage and also enjoy all recreation center activities.



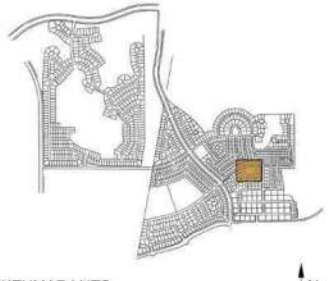
RECREATION / PRIVATE PARK AMENITY

Private Park Amenity Square Footage:

- 3,200 sf of lap pool, play pool, splash pool, and separate spa
- 2,000 sf of shade structures
- 13,000 sf of deck lounge
- 1,400 sf of restrooms & pool equipment
- 33,000 sf of landscape and handicap parking
- 6,900 sf of turf
- 55% Landscape lot coverage percentage
- 10,400 sf in landscape setback

LANDSCAPE LIGHTING LEGEND

SYM	DESCRIPTION
○	AREA POST LIGHT
△	TREE ACCENT UPLIGHT
▬	MONUMENT/SIGNAGE LIGHTING
⊛	PALM TREE COLLAR ACCENT LIGHT
×	SHADE STRUCTURE DOWN LIGHT



KEYMAP | NTS

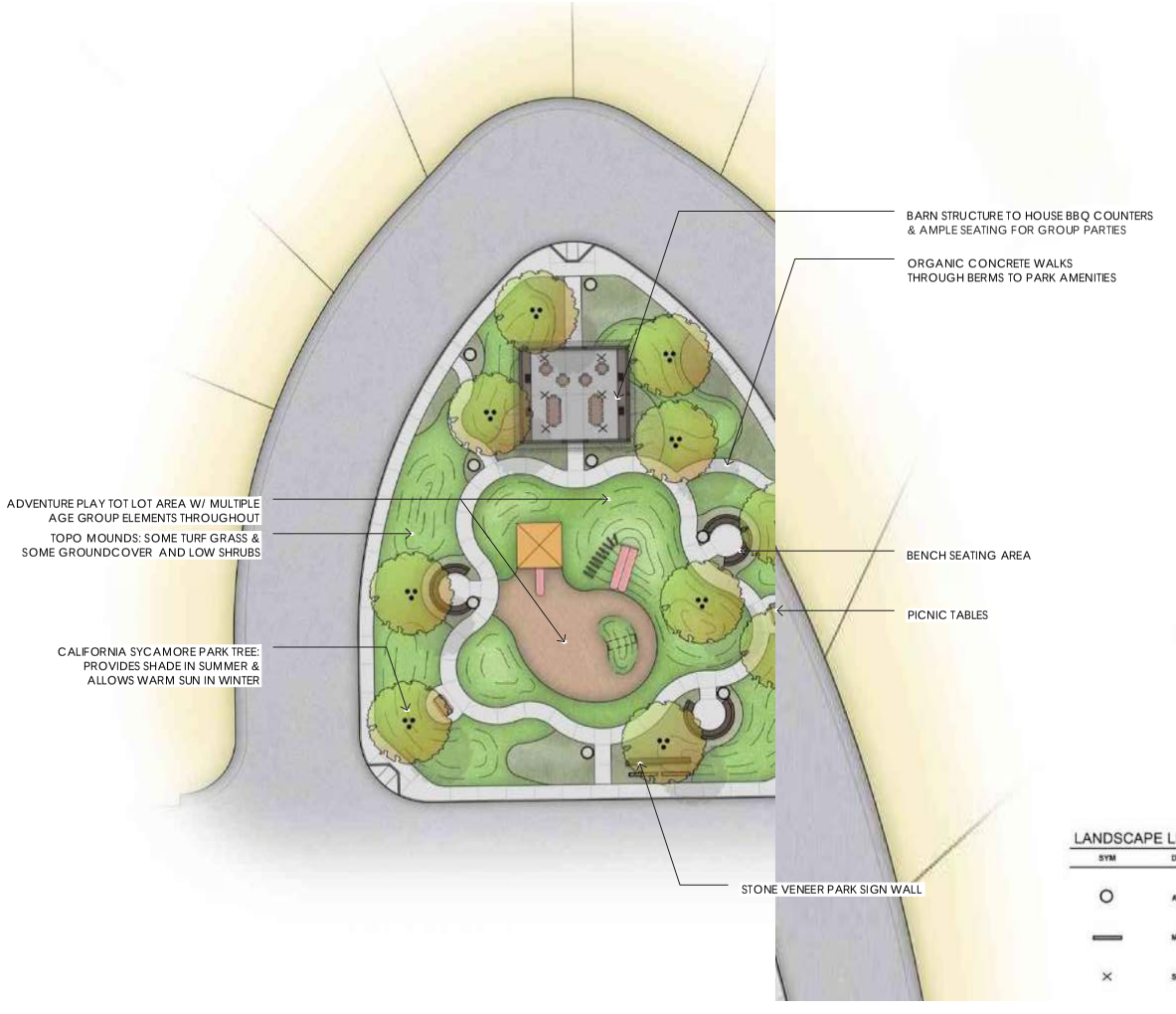
N

NEIGHBORHOOD MINI PARK CONCEPTUAL PLANS

All neighborhood public parks within Alder Creek follow a cohesive conceptual approach that aligns with the broader landscape vision of the community. The Developer envisions installing the parks, with the expectation of cost recovery through reimbursements or fee credits, subject to city approvals.

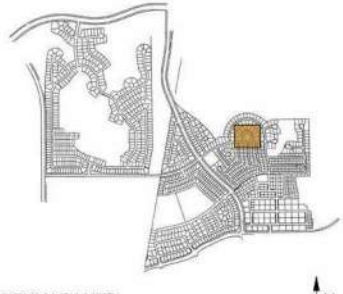
A 0.6 acre neighborhood mini park serves as an example of this concept, providing a thoughtfully designed recreation space. This park features a sizeable adventure play area in conjunction with a contemporary barn style structure to house BBQ counters and ample seating for family and group parties. Berming will be used not only to provide implied separation from surrounding homes but will also add to the character of the natural hilly terrain of Alder Creek. These mounded landforms will also provide implied privacy and setting for seating and picnic areas. Sycamore trees will be used to provide shade in the summer, while allowing the warmth of the sun in the winter.

CONCEPTUAL PLANS - MINI PARK (±0.6 AC.)



LANDSCAPE LIGHTING LEGEND

SYM	DESCRIPTION
○	AREA POST LIGHT
═	MONUMENT/SIGNAGE LIGHTING
×	SHADE STRUCTURE DOWN LIGHT



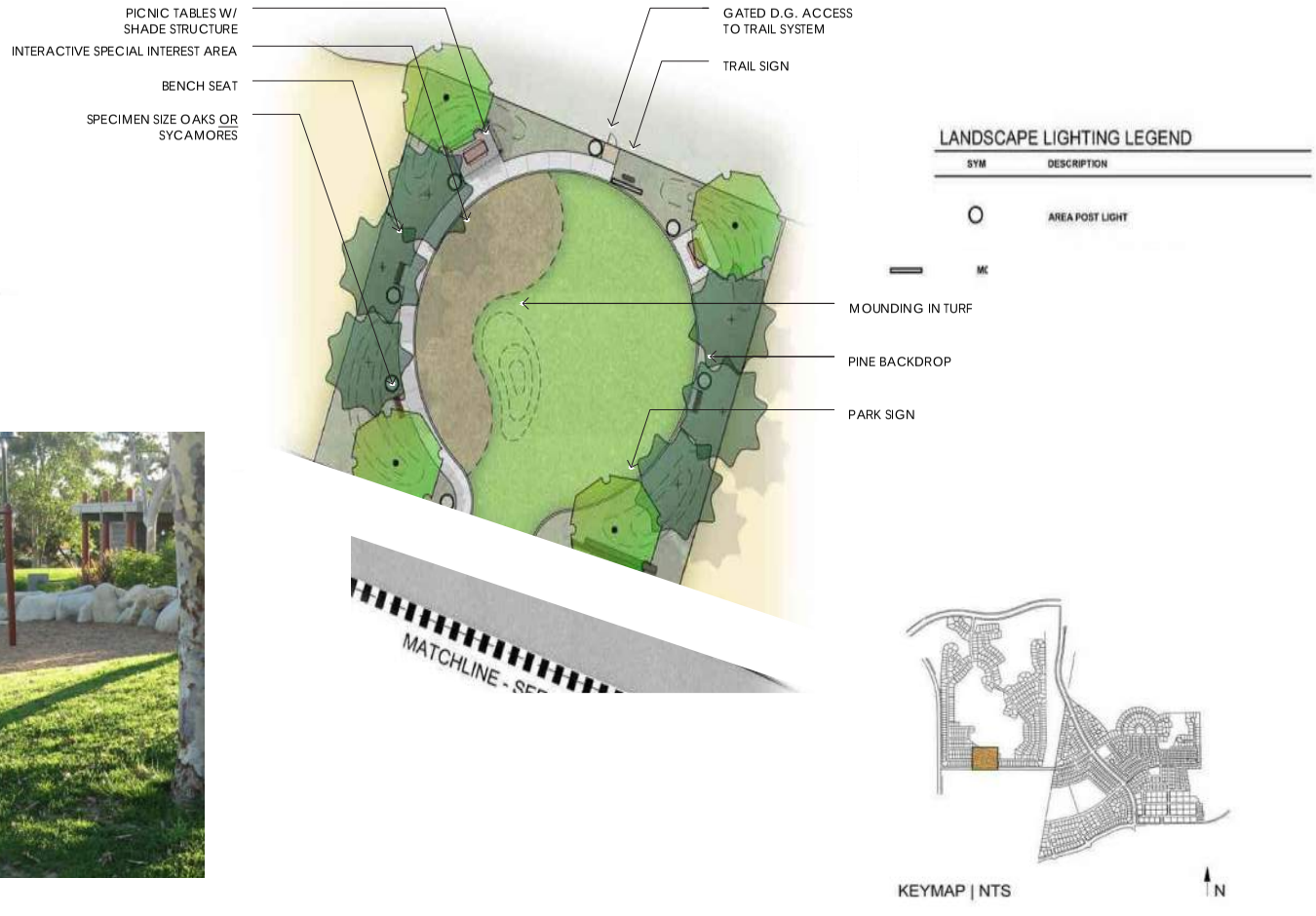
MINI PARK CONCEPTS - GATED NEIGHBORHOOD

All three parks within the gated neighborhood of Alder Creek will be private parks, designed exclusively for residents. These parks follow a cohesive conceptual approach that aligns with the broader landscape vision of the community. They will be installed by the Developer and maintained by the Homeowners Associations.

A concept for these designated park sites allow enough space for a modest size turf open play park. It also serves as a trail head to an extensive nature trail system throughout the Alder Creek nature reserve. Large native or specimen oaks or sycamores will be placed at the trail head to serve as a focal location for picnic tables, while pines will be use to screen adjacent homes and provide natural privacy. Bench seating will be incorporated to accommodate those who just want to relax and enjoy the scenery.

Mini parks will also feature innovative, contemporary design elements such as interactive special interest features and sculptural landscape forms to reinforce a community theme of modern-day living in harmony with nature in Alder Creek. Emphasis will be placed on creating spaces for relaxation and enjoyment, with walkways, benches, and picnic tables to encourage outdoor gathering and appreciation of the natural surroundings.

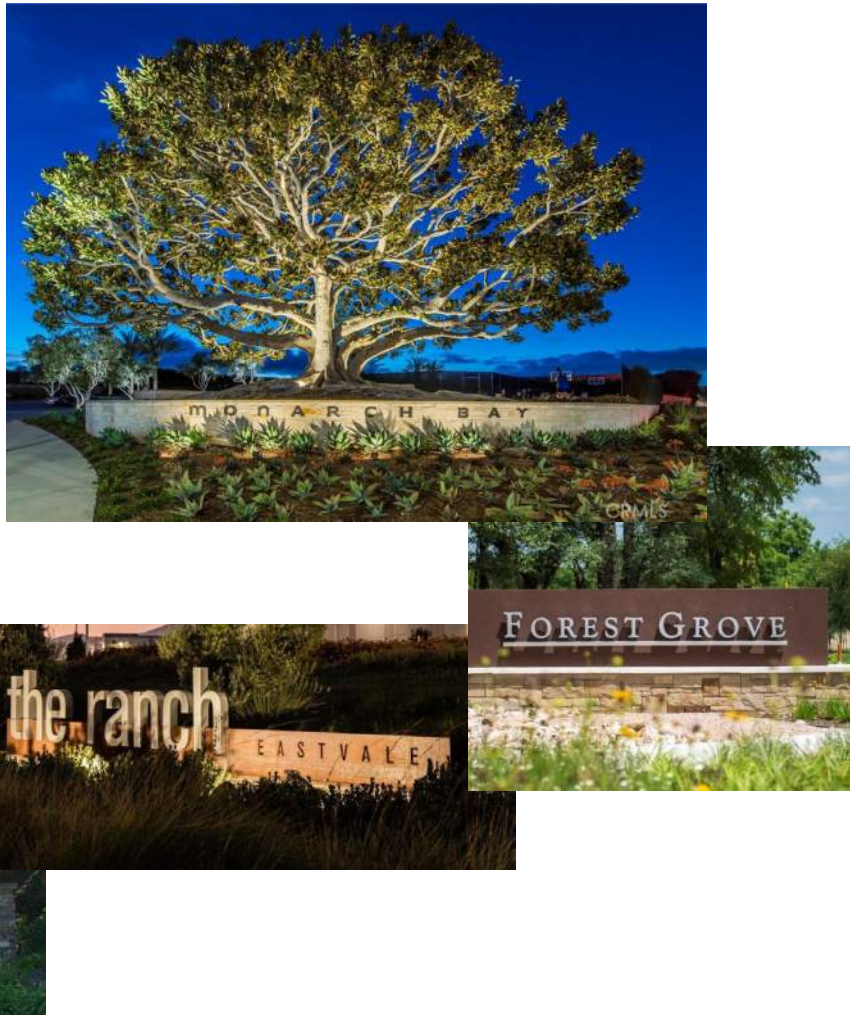
MINI PARK CONCEPT - GATED NEIGHBORHOOD (±0.3 AC.)



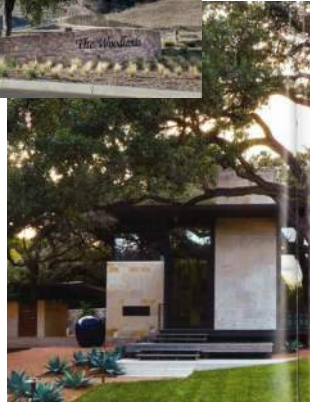
GATED ENTRY / SITE MONUMENTATION

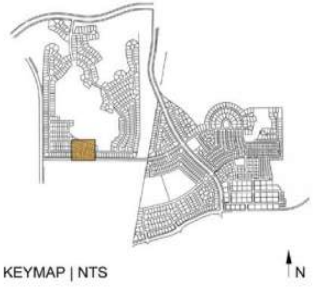
Alder Creek's signage and monumentation strategy aligns with Folsom Ranch's commitment to clear wayfinding and cohesive community branding. Stone veneer elements provide a rustic yet refined aesthetic, bridging the community's agricultural past with its contemporary culture. A common use of stone veneer will ground the community with its California ranch heritage and can be used in rustic and/or precision cut forms depending on the function.

For example, trail head signage would be more rustic in nature, a gated entry and recreation center would use more precision cut stone, and parks would use a combination of both. Sign letters, gates, and any structures related to user functions would be steel except where wood is appropriate, and all designed in a contemporary style to reflect modern lifestyles in harmony with the natural beauty of our site and its western ranch heritage.

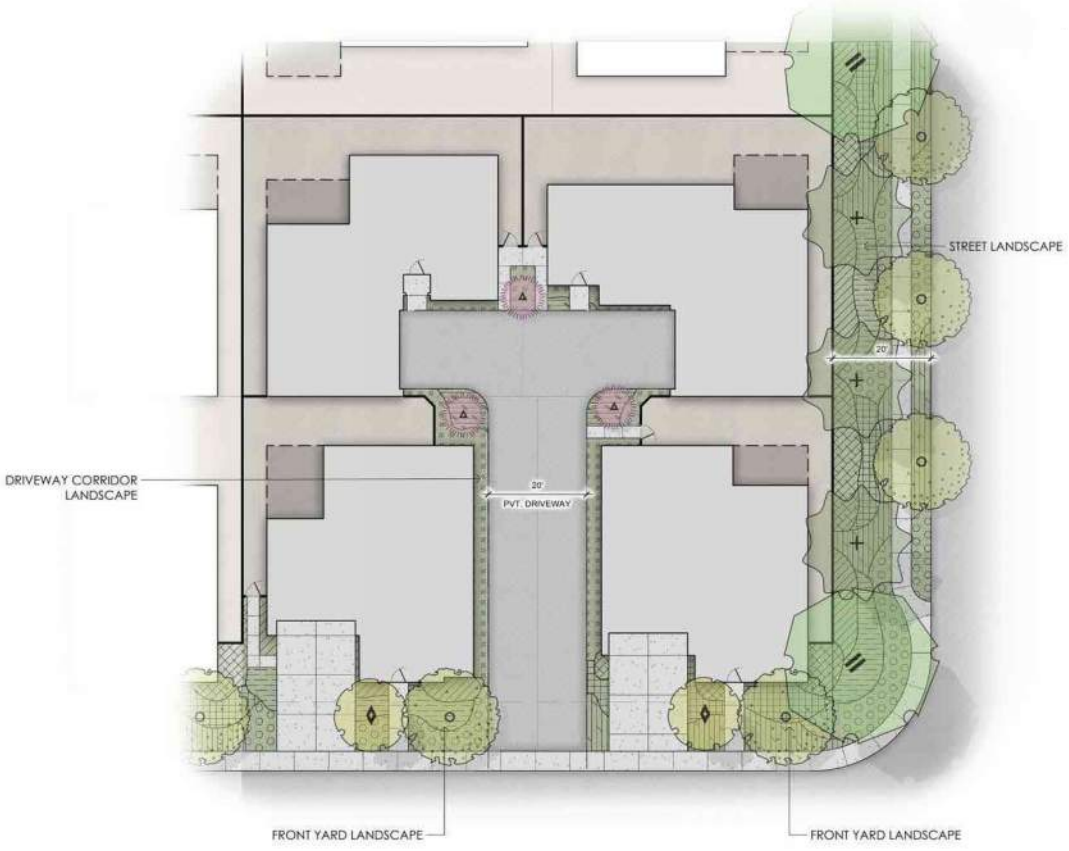


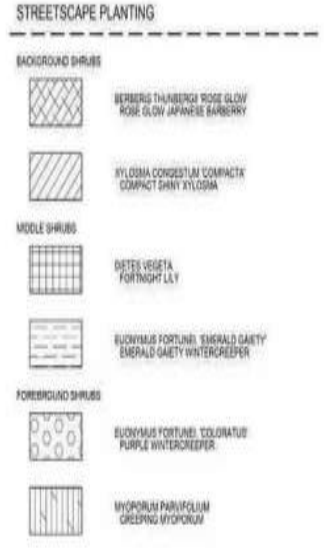
GATED ENTRY / SITE MONUMENTATION



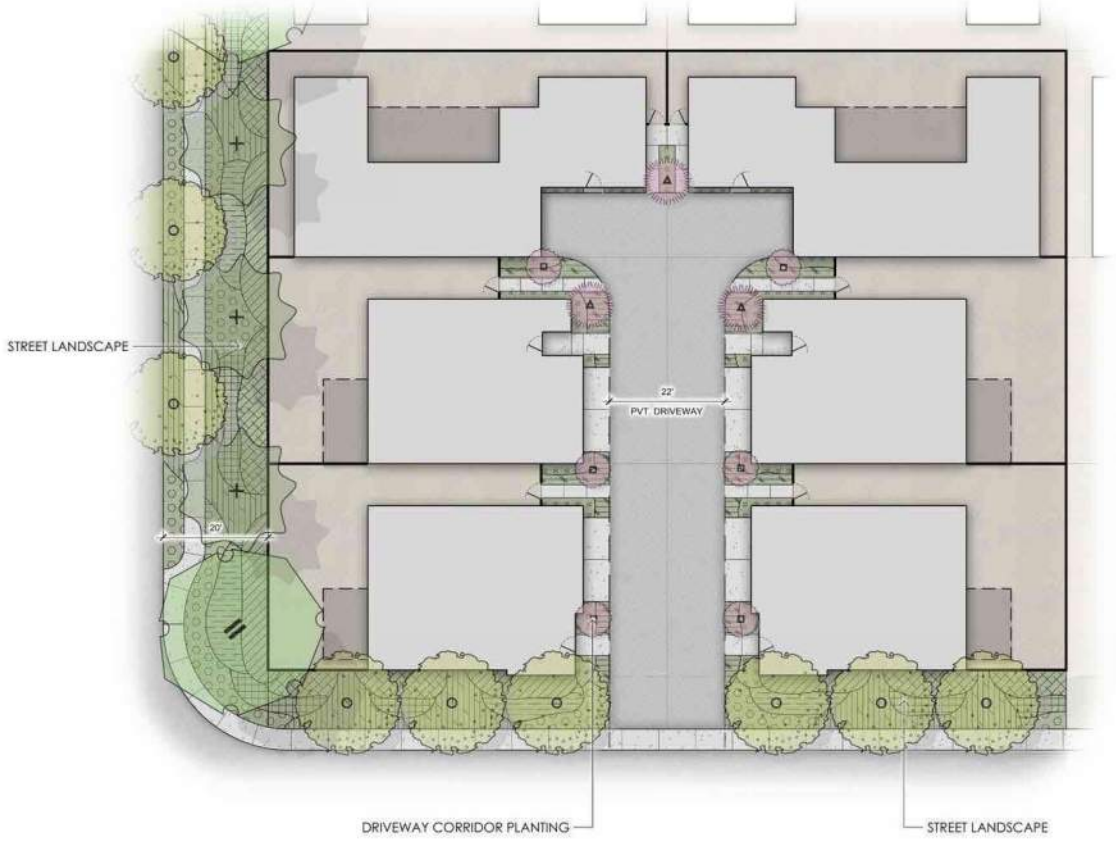


4-PACK PRODUCT | CONCEPTUAL LANDSCAPE PLAN





6-PACK PRODUCT | CONCEPTUAL LANDSCAPE PLAN



TREE LEGEND

	DESCRIPTION	SIZE
//	PLATANUS ACERIFOLIA 'BLOODGOOD' / BLOODGOOD LONDON PLANETREE	65'x35'
	PISTACIA CHINENSIS 'RED PUSH' / RED PUSH PISTACHE	30'x30'
+	PINUS ELDARICA / AFGHAN PINE	60'x20'
	GINKGO BILOBA 'GOLDEN COLONNADE' / 'GOLDEN COLONNADE' GINKGO	40'x20'
O	LAGERSTROEMIA I. 'WATERMELON RED' / WATERMELON RED CRAPE MYRTLE	20'x20'
	ARBUTUS 'MARINA' / MARINA STRAWBERRY TREE	30'x30'
	RHUS LANCEA / AFRICAN SUMAC	25'x30'
△	LAGERSTROEMIA I. 'MUSKOGEE' / MUSKOGEE CRAPE MYRTLE	20'x20' / STD. LOW BRANCH
	CERCIS OCCIDENTALIS / WESTERN REDBUD	15'x15' / STD. LOW BRANCH
	PRUNUS C. 'KRAUTER VESUVIUS' / KRAUTER VESUVIUS PURPLE PLUM	20'x12' / STD. LOW BRANCH
□	PRUNUS CAROLINIANA 'COMPACTA' / CHERRY LAUREL	10'x7' / COLUMNAR
	DODONAEA VISCOSA 'PURPUREA' / PURPLE HOPSEED	12'x6' / COLUMNAR
	PODOCARPUS MACROPHYLLUS 'MAKI' / MAKI CHINESE PODOCARPUS	12'x6' / COLUMNAR

SHRUB LEGEND

DESCRIPTION

DRIVEWAY CORRIDOR SHRUB COMBO 1

- BUXUS MICROPHYLLA J. 'GREEN BEAUTY' / JAPANESE BOXWOOD
- ALOE STRIATA HYB. / GHOST ALOE

DRIVEWAY CORRIDOR SHRUB COMBO 2

- ALOE VERA / ALOE
- CAREX DIVULSA / GREY SEDGE

DRIVEWAY CORRIDOR SHRUB COMBO 3

- DIETES BICOLOR / FORTNIGHT LILY
- MYOPORUM PARVIFOLIUM / CREEPING MYOPORUM

STREETSCAPE PLANTING

BACKGROUND SHRUBS

- BERBERIS THUNBERGII 'ROSE GLOW' / ROSE GLOW JAPANESE BARBERY
- XYLOSMA CONGESTUM 'COMPACTA' / COMPACT SHINY XYLOSMA

MIDDLE SHRUBS

- DIETES VEGETA / FORTNIGHT LILY
- EUONYMUS FORTUNEI 'EMERALD GAIETY' / EMERALD GAIETY WINTERCREEPER

FOREGROUND SHRUBS

- EUONYMUS FORTUNEI 'COLORATUS' / PURPLE WINTERCREEPER
- MYOPORUM PARVIFOLIUM / CREEPING MYOPORUM

Attachment 12
Retaining Walls Exhibit,
dated March 2026

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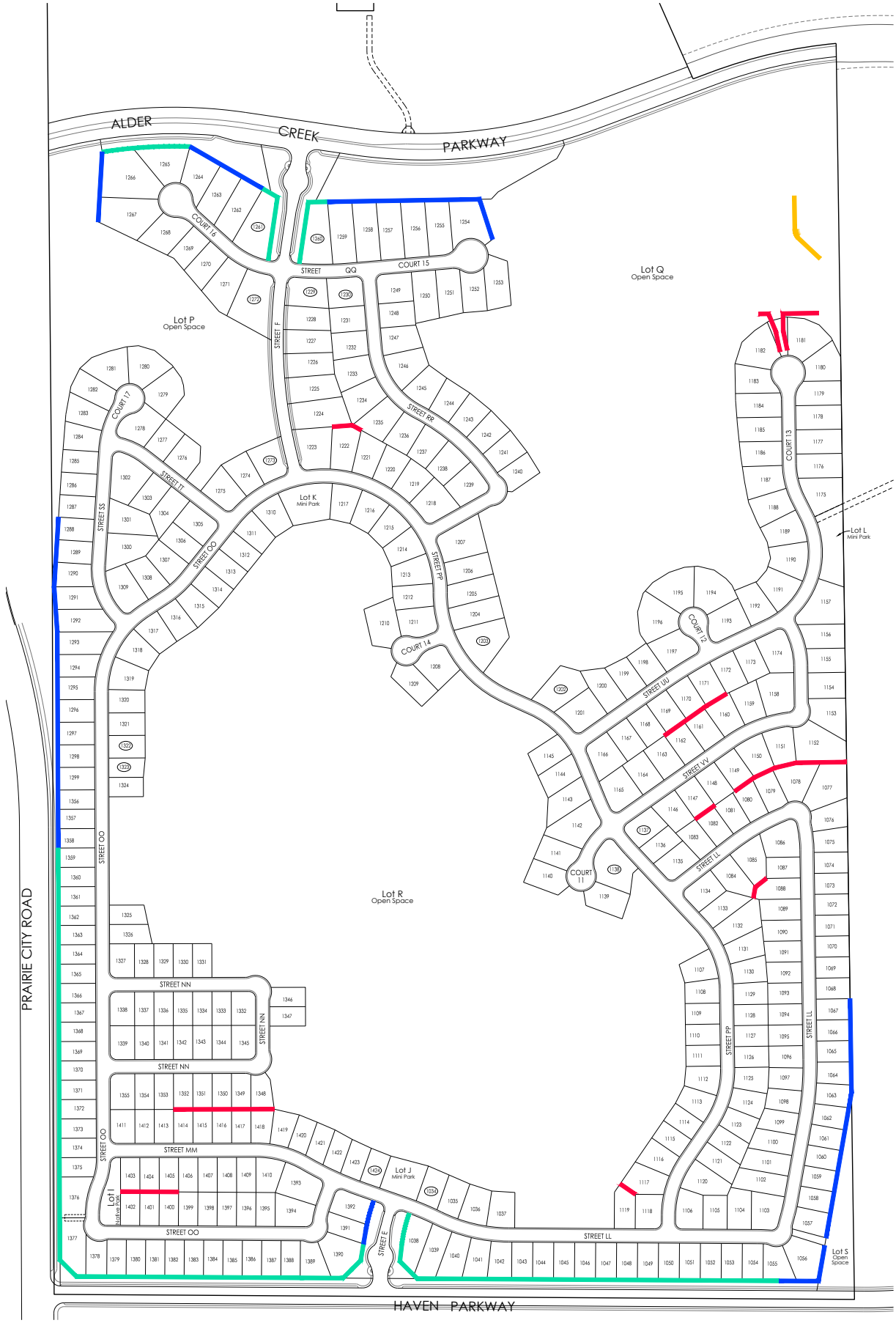

Masonry & Retaining Wall Exhibit

Toll Brothers at Alder Creek West

City of Folsom
Scale 1"=100'
Sheet 1 of 3

California
March, 2026
2723B.TOLL.ENT

MACKAY & SOMPS
CIVIL ENGINEERING PLANNING SURVEYING
1329 Gateway Ridge Drive, Suite 150, Roseville, CA 95678 (916) 724-1190

LEGEND:
- KEYSTONE RETAINING WALL (OVER 4' EXPOSED)
- CMU RETAINING WALL (OVER 4' EXPOSED)
- PERIMETER MASONRY WALL (6' MINIMUM HEIGHT)
- PERIMETER MASONRY WALL ON CMU RETAINING WALL

N

0 50 100 200
SCALE: 1"=100'

PRELIMINARY - Subject to Revision

3-03-2026 18:04:27 shastad I:\2723B\PLN\Applications\IM\EMAC_SLIM\SLIM-MC-SUB-04_20260304\EMAC_Wall Exhibit_SUB04.dwg
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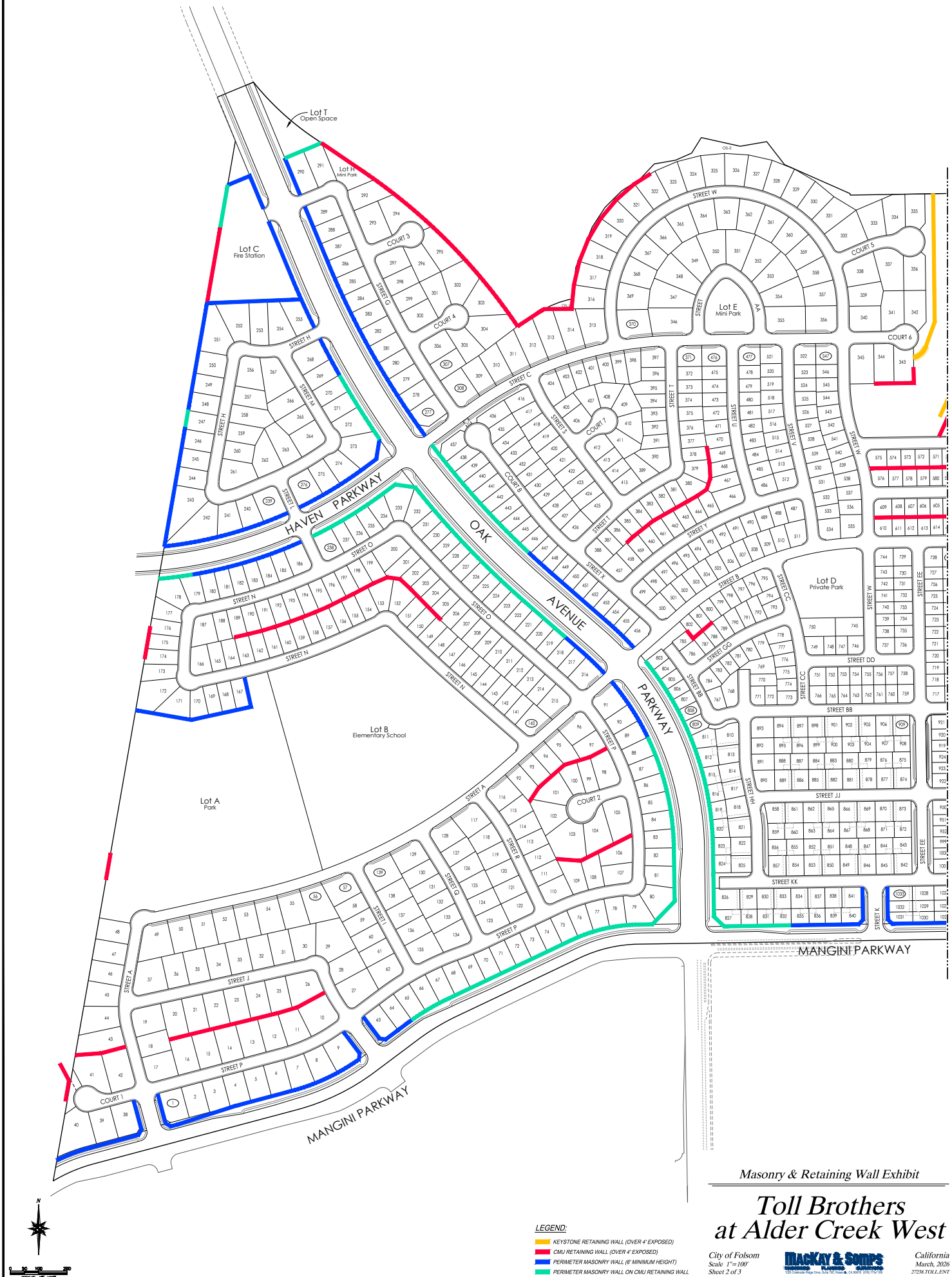


Masonry & Retaining Wall Exhibit

Toll Brothers at Alder Creek West

City of Folsom
Scale 1"=100'
Sheet 2 of 3

California
March, 2026
2723B.TOLL.ENT

LEGEND:

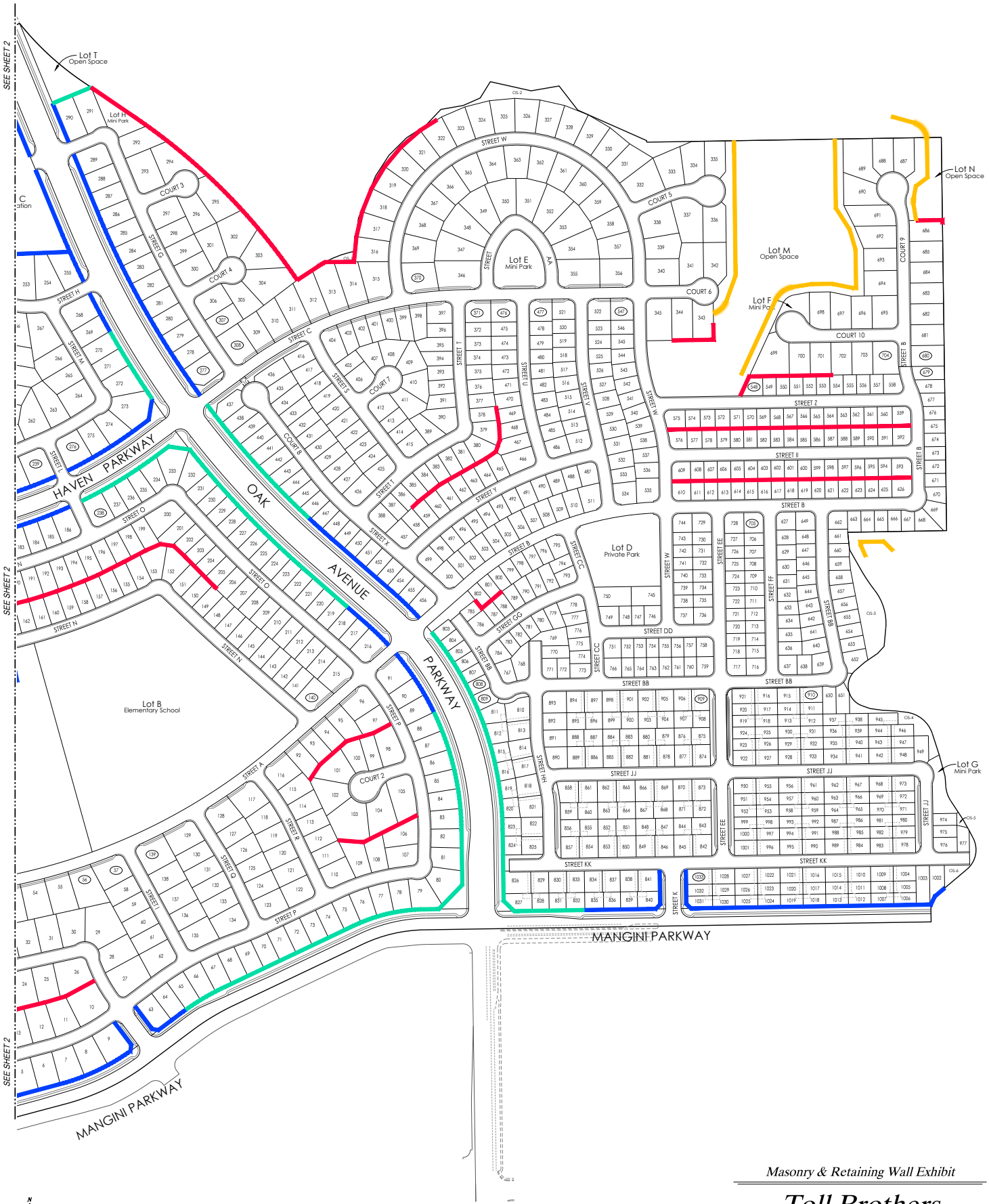
- KEYSTONE RETAINING WALL (OVER 4' EXPOSED)
- CMU RETAINING WALL (OVER 4' EXPOSED)
- PERIMETER MASONRY WALL (6' MINIMUM HEIGHT)
- PERIMETER MASONRY WALL ON CMU RETAINING WALL

N

0 50 100 200
SCALE: 1"=100'

PRELIMINARY - Subject to Revision

MacKay and Somps is not responsible for the accuracy or completeness of reproductions of this document generated by others from electronic media.



Masonry & Retaining Wall Exhibit

Toll Brothers at Alder Creek West

City of Folsom
Scale 1"=100'
Sheet 3 of 3

MacKAY & SOMPS
CIVIL ENGINEERING PLANNING SURVEYING
1535 Drakerado Ridge Drive, Suite 150, Folsom, CA 95630 (916) 724-1190

California
March, 2026
2723B.TOLL.ENT

LEGEND:

- KEYSTONE RETAINING WALL (OVER 4' EXPOSED)
- CMU RETAINING WALL (OVER 4' EXPOSED)
- PERIMETER MASONRY WALL (6' MINIMUM HEIGHT)
- PERIMETER MASONRY WALL ON CMU RETAINING WALL

N

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SCALE: 1"=100'

PRELIMINARY - Subject to Revision

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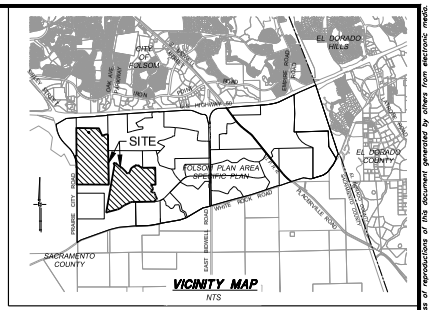
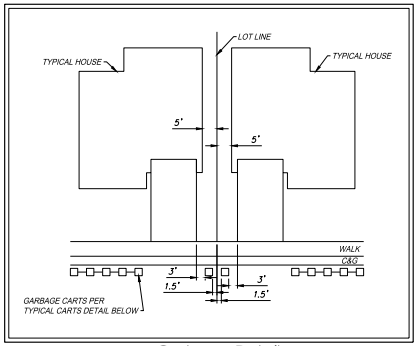
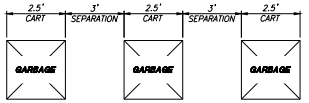
Attachment 13
Solid Waste Management Cart Location Exhibit, dated June 2025



VICINITY MAP
NTS



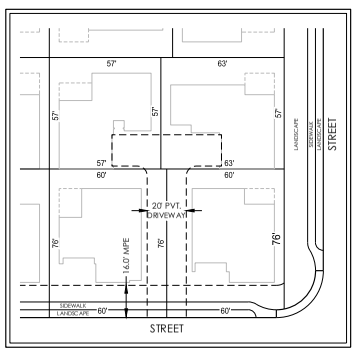
Garbage Detail
1"=20'
NOTE: Building footprints are conceptual and subject to revision.



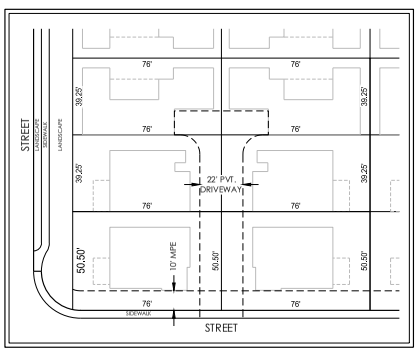
TYPICAL CARTS DETAIL
NTS

NOTES:

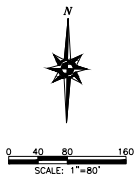
1. DIMENSIONS SHOWN IN PLAN VIEW DEPICTS THE WIDTH OF OPEN AREA TO PLACE A CART. NOT CART WIDTHS. REFER TO TYPICAL CARTS DETAIL ON THIS SHEET FOR CART WIDTHS AND SEPARATION.



4-PACK
TYPICAL LOT DIAGRAM
1"=30'
NOTE: Building footprints are conceptual and subject to revision.



6-PACK
TYPICAL LOT DIAGRAM
1"=30'
NOTE: Building footprints are conceptual and subject to revision.



SOLID WASTE MANAGEMENT PLAN
CART LOCATIONS EXHIBIT

TOLL BROTHERS at ALDER CREEK

City of Folsom
Scale 1"=80'

MacKAY & SOMPS
PLANNING ENGINEERING SURVEYING
1535 Colebrooke Ridge Drive, Suite 150, Roseville, CA 95678 (916) 773-1189

California
June 2025
27258.TOLL.ENT

PRELIMINARY - Subject to Revision

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6-25-2025 16:07:46 dwgplot P:\27258\LDCS\LDA-D\Toll Brothers at Alder Creek Solid Waste Management Plan.dwg
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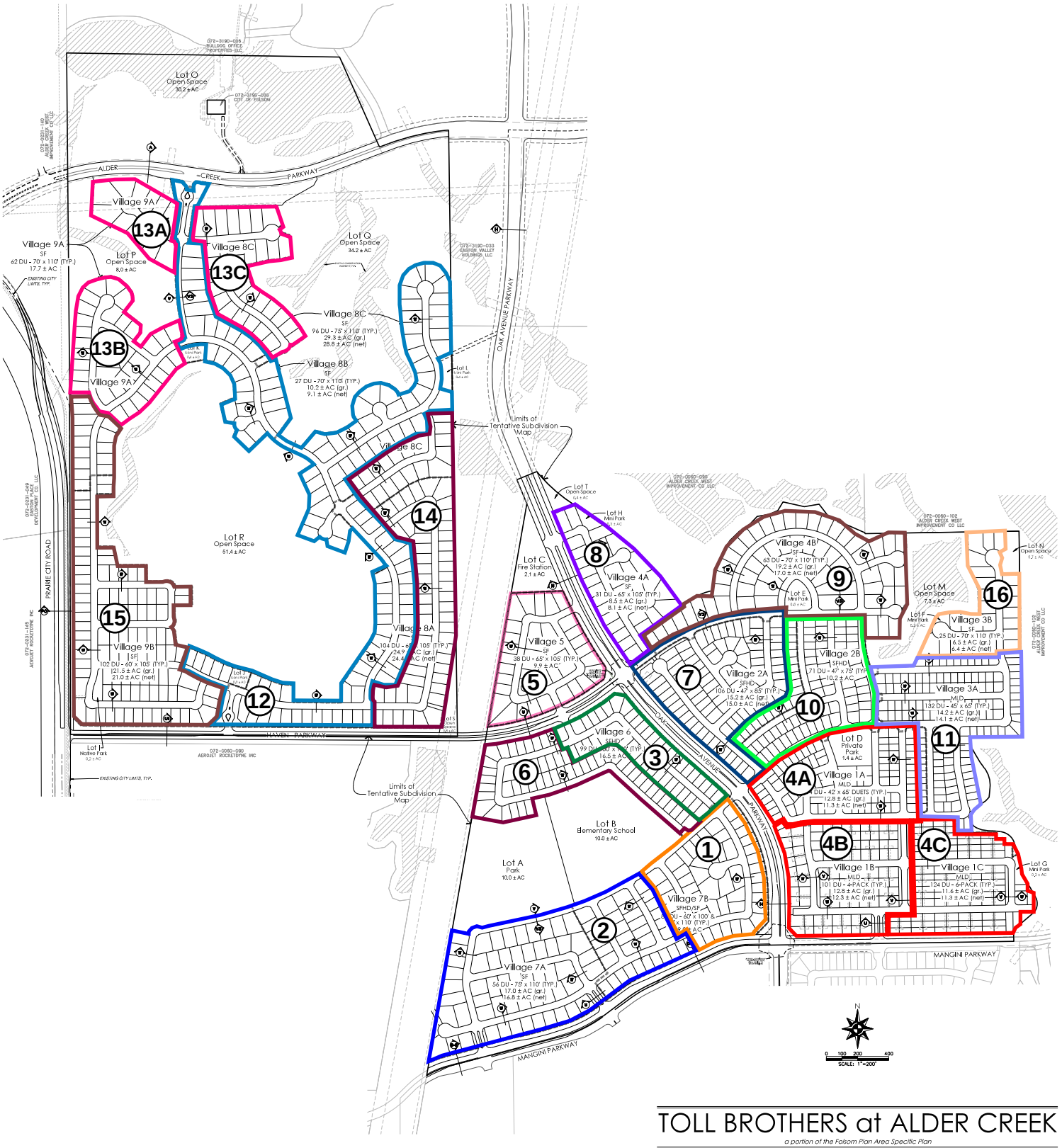
Attachment 14

Toll Brothers at Alder Creek Final Map Preliminary Phasing Exhibit, dated May 6, 2026

PRELIMINARY FINAL MAP PHASING PLAN

May 6, 2026



TOLL BROTHERS at ALDER CREEK

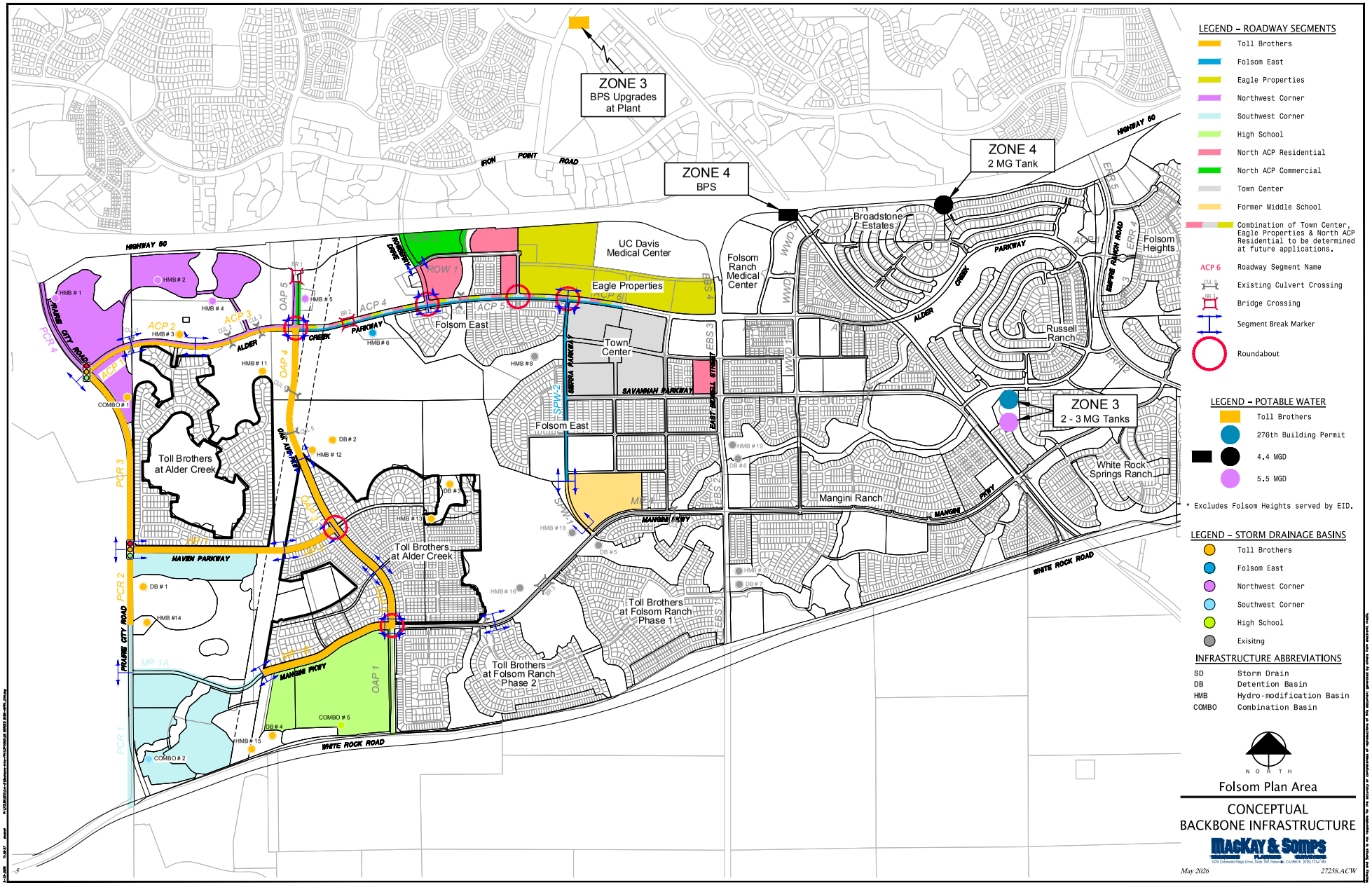
a portion of the Folsom Plan Area Specific Plan

Folsom, CA

MacKAY & SOMPS
Engineering Planning Surveying

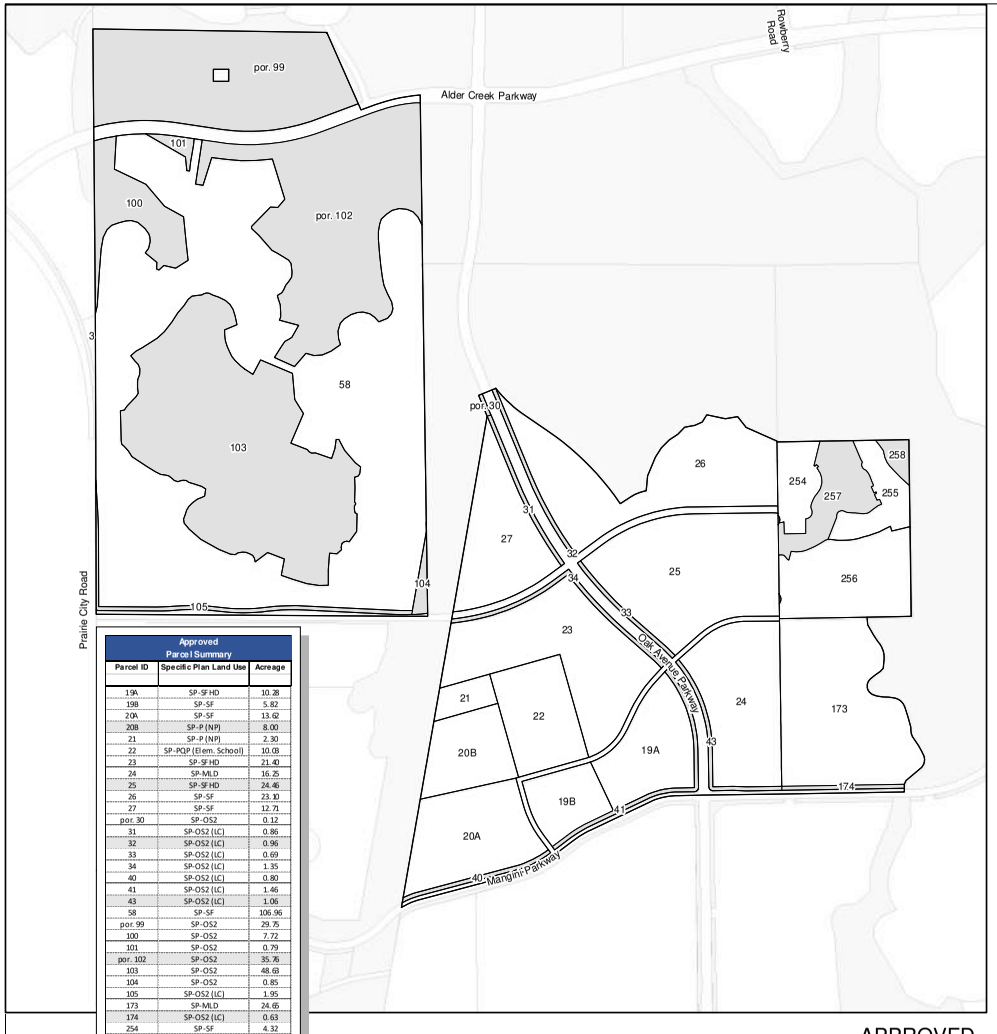
Attachment 15

Folsom Plan Area Conceptual Backbone Infrastructure Phasing Plan, dated May 2026


ZONE 3
BPS Upgrades at Plant
ZONE 4
BPS
ZONE 4
2 MG Tank
ZONE 3
2 - 3 MG Tanks
IRON POINT ROAD
HIGHWAY 50
PRAIRIE CITY ROAD
HAVEN PARKWAY
MANGINI PKWY
WHITE ROCK ROAD
ALDER CREEK PARKWAY
SAVANNAH PARKWAY
SIERRA PARKWAY
EAST NATOMA STREET
ALDER CREEK
EMPIRE RANCH ROAD
UC Davis Medical Center
Folsom Ranch Medical Center
Eagle Properties
Folsom East
Town Center
Broadstone Estates
Folsom Heights
Russell Ranch
Mangini Ranch
White Rock Springs Ranch
Toll Brothers at Alder Creek
Toll Brothers at Folsom Ranch Phase 1
Toll Brothers at Folsom Ranch Phase 2
LEGEND – ROADWAY SEGMENTS
Toll Brothers
Folsom East
Eagle Properties
Northwest Corner
Southwest Corner
High School
North ACP Residential
North ACP Commercial
Town Center
Former Middle School
Combination of Town Center, Eagle Properties & North ACP Residential to be determined at future applications.
ACP 6 Roadway Segment Name
Existing Culvert Crossing
Bridge Crossing
Segment Break Marker
Roundabout
LEGEND – POTABLE WATER
Toll Brothers
276th Building Permit
4.4 MGD
5.5 MGD
* Excludes Folsom Heights served by EID.
LEGEND – STORM DRAINAGE BASINS
Toll Brothers
Folsom East
Northwest Corner
Southwest Corner
High School
Exisitng
INFRASTRUCTURE ABBREVIATIONS
SD Storm Drain
DB Detention Basin
HMB Hydro-modification Basin
COMBO Combination Basin
NORTH
Folsom Plan Area
CONCEPTUAL
BACKBONE INFRASTRUCTURE
MacKay & Somps
May 2026
27238.ACW

Attachment 16

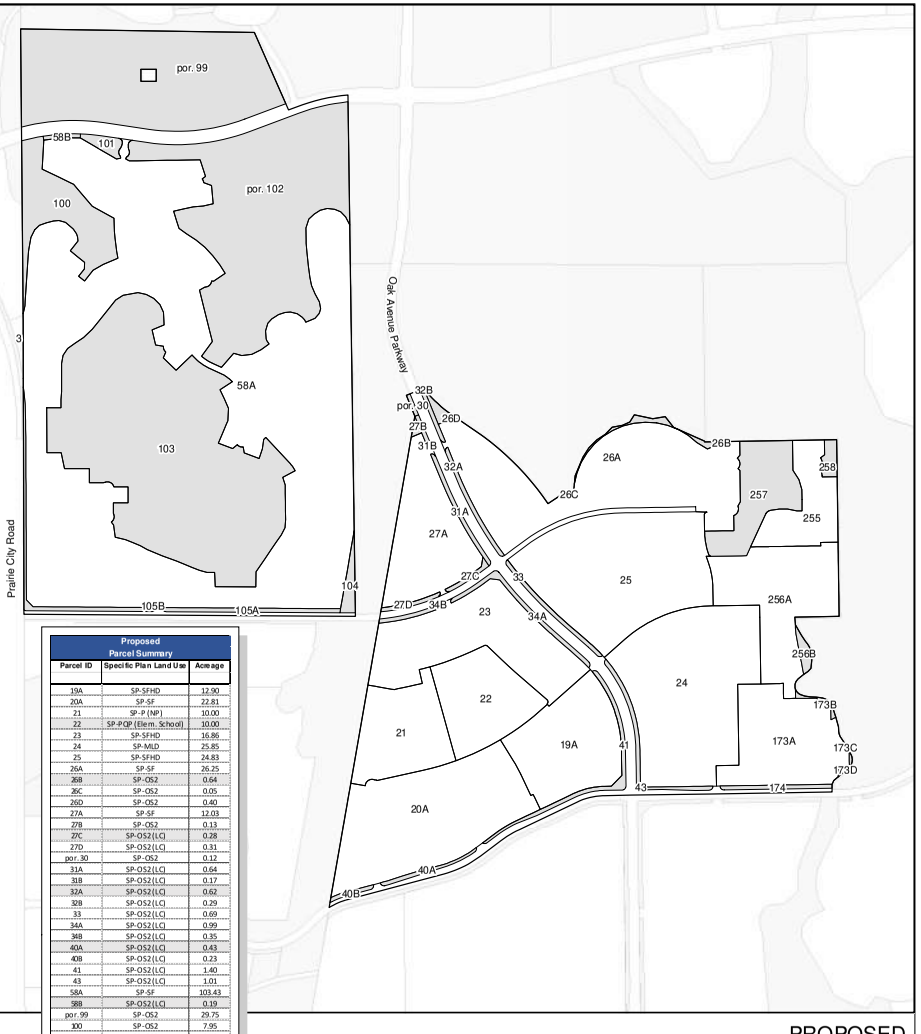
Minor Administrative Modification Exhibits, dated April 7, 2025



APPROVED

Approved Parcel Summary

Parcel ID	Specific Plan Land Use	Acreage
19A	SP-SFHD	10.28
19B	SP-SF	5.82
20A	SP-SF	13.62
20B	SP-P (NP)	8.00
21	SP-P (NP)	2.30
22	SP-PQP (Elem. School)	10.08
23	SP-SFHD	21.40
24	SP-MLD	16.25
25	SP-SFHD	24.46
26	SP-SF	23.30
27	SP-SF	12.71
por. 30	SP-OS2	0.12
31	SP-OS2 (LC)	0.86
32	SP-OS2 (LC)	0.96
33	SP-OS2 (LC)	0.69
34	SP-OS2 (LC)	1.35
40	SP-OS2 (LC)	0.80
41	SP-OS2 (LC)	1.46
43	SP-OS2 (LC)	1.06
58	SP-SF	106.96
por. 99	SP-OS2	29.75
100	SP-OS2	7.72
101	SP-OS2	0.79
por. 102	SP-OS2	35.76
103	SP-OS2	48.68
104	SP-OS2	0.85
105	SP-OS2 (LC)	1.95
173	SP-MLD	24.65
174	SP-OS2 (LC)	0.63
254	SP-SF	4.32
255	SP-SF	4.94
256	SP-MLD	13.08
257	SP-OS2	6.49
258	SP-OS2	1.11
ROW	SP-OS2	21.32
Total		464.20



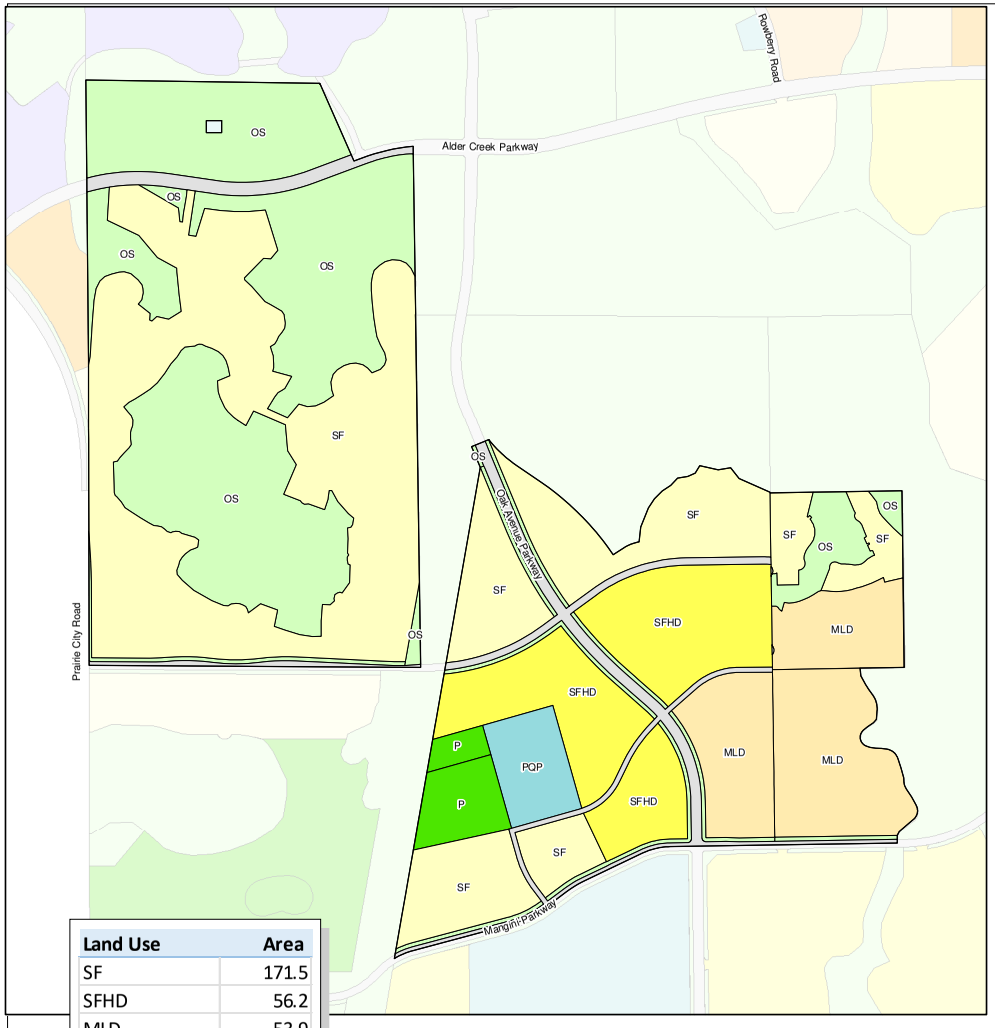
PROPOSED

Proposed Parcel Summary

Parcel ID	Specific Plan Land Use	Acreage
19A	SP-SFHD	12.90
20A	SP-SF	22.81
21	SP-P (NP)	10.00
22	SP-PQP (Elem. School)	10.00
23	SP-SFHD	16.86
24	SP-MLD	25.85
25	SP-SFHD	24.83
26A	SP-SF	26.25
26B	SP-OS2	0.64
26C	SP-OS2	0.05
26D	SP-OS2	0.40
27A	SP-SF	12.03
27B	SP-OS2	0.13
27C	SP-OS2 (LC)	0.28
27D	SP-OS2 (LC)	0.31
por. 30	SP-OS2	0.12
31A	SP-OS2 (LC)	0.64
31B	SP-OS2 (LC)	0.17
32A	SP-OS2 (LC)	0.62
32B	SP-OS2 (LC)	0.29
33	SP-OS2 (LC)	0.69
34A	SP-OS2 (LC)	0.99
34B	SP-OS2 (LC)	0.35
40A	SP-OS2 (LC)	0.43
40B	SP-OS2 (LC)	0.23
41	SP-OS2 (LC)	1.40
43	SP-OS2 (LC)	1.01
58A	SP-SF	103.43
58B	SP-OS2 (LC)	0.19
por. 99	SP-OS2	29.75
100	SP-OS2	7.95
101	SP-OS2	0.70
por. 102	SP-OS2	36.09
103	SP-OS2	51.40
104	SP-OS2	0.82
105A	SP-OS2 (LC)	0.91
105B	SP-OS2 (LC)	1.32
173A	SP-MLD	12.48
173B	SP-MLD	0.24
173C	SP-MLD	0.02
173D	SP-MLD	0.12
174	SP-OS2 (LC)	0.57
255	SP-SF	6.54
256A	SP-MLD	13.92
256B	SP-MLD	0.49
257	SP-OS2	7.33
258	SP-OS2	0.67
ROW	Major Roads	18.98
Total		464.20

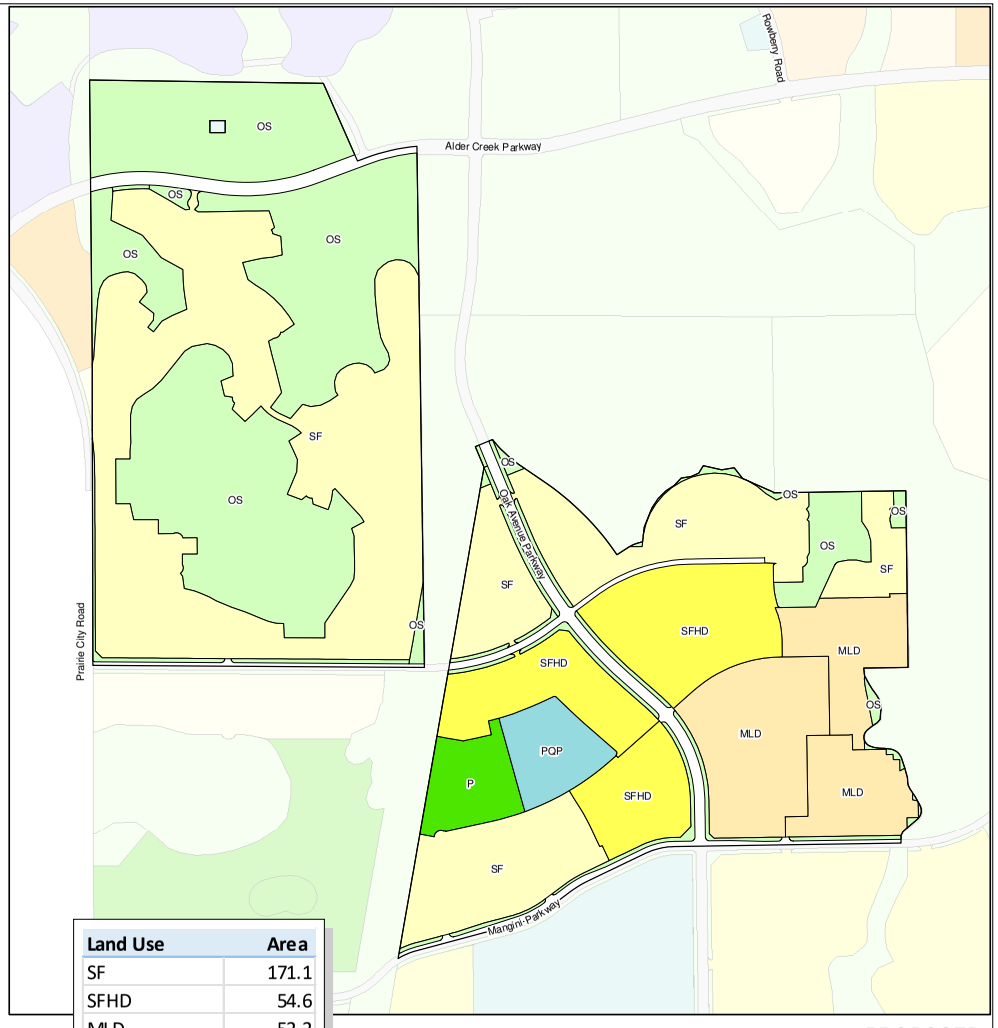
MAM EXHIBIT
TOLL BROTHERS at ALDER CREEK
April 7, 2025

Document Path: P:\27238\GIS\TBAC_MAM_Exhibit.mxd



APPROVED

Land Use	Area
SF	171.5
SFHD	56.2
MLD	53.9
P	10.3
PQP	10.0
OS	131.2
OS-LC	9.8
ROW	21.3
Grand Total	**464.2**



PROPOSED

Land Use	Area
SF	171.1
SFHD	54.6
MLD	52.2
P	10.0
PQP	10.0
OS	137.1
OS-LC	10.4
ROW	18.8
Grand Total	**464.2**

LAND USE EXHIBIT
TOLL BROTHERS at ALDER CREEK

April 7, 2025

Document Path: P:\27238\GIS\TBAC_LandUse_Exhibit.mxd

Minor Administrative Modification
Alder Creek Parkway Revised Roadway Cross Section

As part of this application, a modification to the existing Folsom Plan Area Specific Plan roadway cross section for Alder Creek Parkway (Section 'A') is proposed, as shown below. The purpose of this amendment is to allow for bus transit in mixed flow lanes, given that Regional Transit is not likely to pursue Bus Rapid Transit in the corridor. This allows for a reduced roadway cross section but maintains space for bus pull outs along the roadway while maintaining space for pedestrians and cyclists. The existing and proposed roadway cross sections are shown on the next page.

Existing Roadway Cross Section – Alder Creek Parkway, Section 'A'

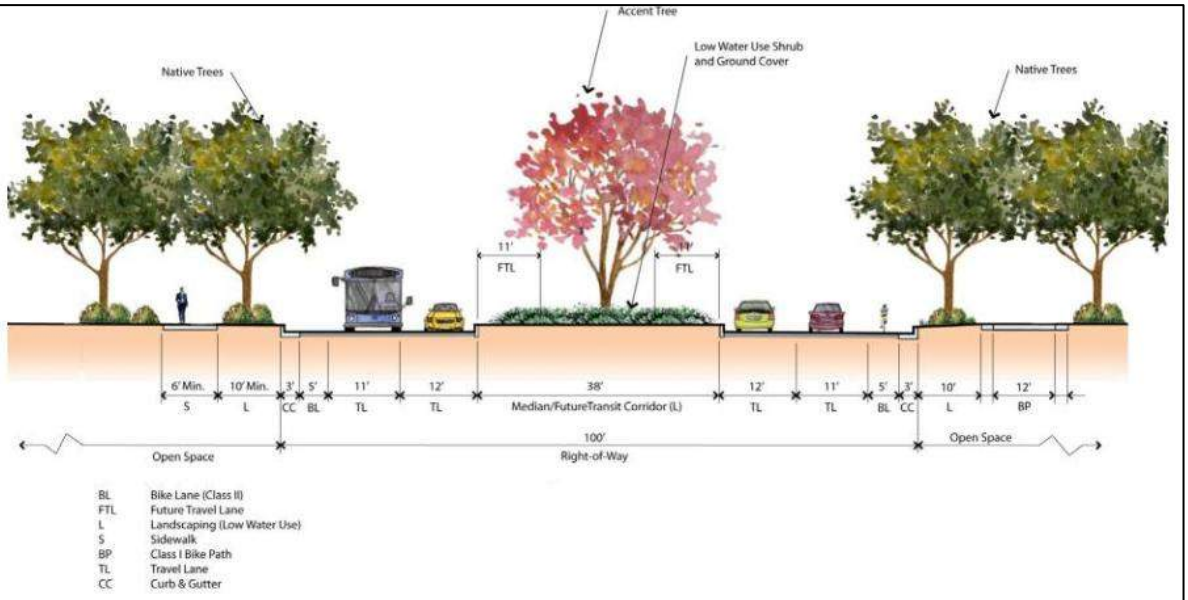
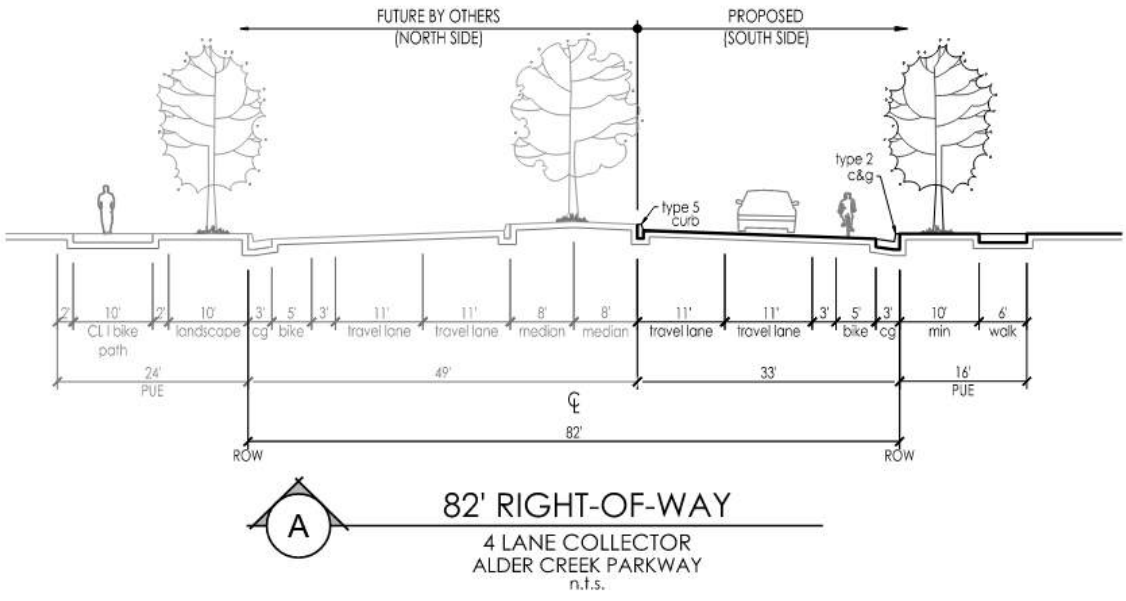


Figure 7.2 - Alder Creek Parkway
(Section A - 4 Lane Open Space Arterial)

Proposed Roadway Cross Section – Alder Creek Parkway, Section 'A'



Attachment 17

Street Name List, Final, dated March 17, 2026

Toll Brothers at Alder Creek - Proposed Street Names

There are 94 streets to be named.

Folsom Historic Street Names

1	Assay
2	Claudd
3	Crow
4	Hyman
5	Koster
6	McWillaims
7	Merrill
8	Morris
9	Mundt
10	Otis
11	Simpson
12	Van Wicklin

Themed Street Names

13	Acorn
14	Alder
15	Ancona
16	Ashby
17	Ashwood
18	Aspen
19	Barlow
20	Bentley
21	Blackhawk
22	Briar
23	Brooklyn
24	Bur Oak
25	Butternut
26	Callahan
27	Cascade
28	Darwin
29	Deer View
30	Druella
31	Durand
32	Esping
33	Evergreen
34	Firwood
35	Ginkgo
36	Grayson
37	Greenwood
38	Gunson
39	Haven
40	Hickory
41	Hollow
42	Ironwood
43	Isla
44	Jubilee
54	Maplewood
55	Marla
56	Marlow
57	McCarron
58	Meadowbrook
59	Mulberry
60	Myrtle
61	Noble
62	Northstar
63	Oaken
64	Oakley
65	Parahus
66	Pincrest
67	Pinehurst
68	Poplar
69	Primrose
70	Redhawk
71	Ridgewood
72	Ring
73	Rose Glen
74	Rosewood
75	Rowan
76	Sable
77	Silverleaf
78	Sorrento
79	Split Oak
80	Sylvan
81	Tudor
82	Tundra
83	Upland
84	Vargas-Andrews
85	Vernal

45 Kaur
46 Kingsley
47 Lana
48 Laurel
49 Linden
50 Liverpool
51 Madrone
52 Mahogany
53 Manchester
86 Walnut
87 Wildlife
88 Willoughby
89 Willow
90 Wisteria
91 Wood Rose
92 Woodhaven
93 Yearly
94 Yellowberry

Attachment 18
Inclusionary Housing Plan Letter, dated April 15, 2026

Toll Brothers
AMERICA'S LUXURY HOME BUILDER®

April 15, 2026

Jessica Brandt
Principal Planner, City of Folsom
50 Natoma Street, Folsom CA 95630

RE: Toll Brothers at Alder Creek Small Lot Vesting Tentative Map
Inclusionary Housing Ordinance

Ms. Brandt,

Regarding our application for a Small Lot Vesting Tentative Subdivision Map known as Toll Brothers at Alder Creek Toll West, Inc., we (Toll Brothers) is formally notifying the City of Folsom that we elect to comply with the recent City Council Resolution 11510 amending the Inclusionary Housing Ordinance.

It is our intent to comply with Chapter 17.104 of the Folsom Municipal Code, including Section 17.104.060(f)(5), by satisfying the Ordinance requirements through payment of the applicable in-lieu fee as permitted under the Ordinance.

Should there be any clarifications needed regarding this matter, please do not hesitate to contact me.

Sincerely,
TOLL BROTHERS

Martin Nivinski
Director, Land Entitlement
mnivinski@tollbrothers.com
916-677-7088

Attachment 19
Project Narrative, dated April 2026

Toll Brothers at Alder Creek Vesting Small Lot Tentative Map

Development Application Package - Project Narrative

About Toll Brothers:

Toll Brothers is a Fortune 500 Company and the nation's leading builder of luxury homes. We were founded in 1967 and serve first-time, move-up, empty-nester, active-adult, and second-home buyers, as well as urban and suburban renters. We build in 60 different markets in 24 states. We operate our own architectural, engineering, mortgage, title, land development, smart home technology, and landscape subsidiaries. We also develop master-planned and golf course communities, operate our own lumber distribution, house component assembly, and manufacturing operations.

Toll Brothers marked 11 years in a row being named to the Fortune's World's Most Admired Companies™ list, and the Company's Chairman and CEO Douglas C. Yearley, Jr., was named one of the 25 Top CEOs by Barron's Magazine in 2024. Toll Brothers has also been named Builder of the Year by Builder Magazine and is the first two-time recipient of Builder of the Year from Professional Builder Magazine.

Local Background:

Toll Brothers has two active communities in the City of Folsom; a 919-unit single family active adult (age restricted) community and a 211-unit single family traditional community. We secured our entitlements for these communities by processing two separate Vesting Tentative Maps with the City in 2020 and 2022 respectively. Our active adult community known as "Regency at Folsom Ranch" has seen tremendous success as the premier active adult community in the greater Sacramento region since opening for sale in 2021. Our traditional community model homes were completed in April 2024 and are being well received by future City of Folsom residents, as evidenced by robust sales.

Project Overview:

We are requesting approval of a Small Lot Vesting Tentative Map, Planned Development Permit, Design Guidelines, and Minor Administrative Modification containing 1,424 single family dwelling units with varying densities covering 464.2 acres. A variety of other parcels are also included for land uses such as private recreation, parks, landscaping, open space, roadways, a fire station, and an elementary school. In total, 1,488 total lots will be created.

$190,991.00 in live checks made payable to the City of Folsom are enclosed for the City to review the Vesting Small Lot Tentative Map and its associated entitlement requests.

Over the past two years (+/-) of diligent research, hiring of the area's foremost experts on the Folsom Plan Area Specific Plan, pre-application meeting with City department heads and staff, and countless meetings with City Staff, it is Toll Brothers firm belief that the proposed Vesting Small Lot Tentative Map and associated entitlements comply with all City requirements, as well as the requirements of the State of California Subdivision Map Act. This project narrative will touch on the major components of our application, and we fully anticipate Staff's concurrence with our results and conclusions, swiftly moving our application forward to Planning Commission and City Council with a recommendation for approval.

Items submitted with this entitlement request include:

1. $190,991.00 in Planning Application Fees made payable to the City of Folsom
2. Completed and signed Development Permit Application
3. Project Narrative
4. Illustrative Site Plan
5. Vesting Tentative Map
6. Preliminary Grading, Storm Drainage, Sewer, Recycled and Domestic Water Plans, Wall & Fence
7. Existing and Plotted Easements Plan
8. Signed Environmental Information Form
9. Minor Administrative Modification Exhibit and Land Use Exhibit
10. Title Report
11. Arborist Report
12. Traffic Report / Access & Circulation Study
13. Landscape Theming and Design Guidelines
14. Preliminary Homesite Design Guidelines
15. Preliminary Homesite Architectural Themes
16. Proposed Street Names
17. Property Conveyance Exhibit
18. List of all property owners within 300 feet of the subject properties
19. Radius Map and Certification of properties within 300 feet from the subject parcel boundaries
20. Supply of stamped and addressed envelopes to all properties within 300 feet
21. One set of all plans and documents on a USB Drive

Vesting Small Lot Tentative Map Land Use Summary

Total Acreage	464.2
Dwelling Units	1,424
Number of Parks	10.0
Park Acreage	13.6
Open Space Acreage	137.3
Major Roadway Acreage	19.7
Fire Station Acreage	2.1
Elementary School Acreage	10.0

Existing Project Level Entitlements

The Folsom Plan Area Specific Plan (FPASP or Plan) was approved by the City Council on June 28, 2011, and has been amended multiple times, with the current FPASP being dated December 22, 2025. The Plan sets forth a framework for the location, type, and areas of individual land uses, and also provides for a number of planning principals, objectives, and policies. The Toll Brothers at Alder Creek Small Lot Vesting Tentative Map property lies within the Southwest District of the FPASP, and has been carefully designed to comply with the framework of implementation measures set forth in the FPASP.

Per Section 13 of the FPASP, the principals, objectives, policies, and guidelines have been written in a manner to promote high quality development that will allow for creativity and flexibility in design. We at Toll Brothers pride ourselves on our unwavering commitment and dedication to high quality development not only in Folsom, but nationwide.

Residential Land Plan Overview

The Vesting Small Lot Tentative Map contains 1,424 residential lots with varying zoning densities. We have designed the Map in a concerted effort to accommodate a wide variety of housing types and price points. In total, there are twelve (12) different lot sizes, each of which comply with the zoning designations and densities identified in the General Plan and the Specific Plan. The summary of each lot size, type, zoning designation and density can be found in the table below. Net density is calculated using gross acreage as required by the Specific Plan.

T-Map Village Number	Zoning Designation	Lot Size	Gross Acres	Dwelling Units	Net Density
1A	MLD	42' x 65' Duets	12.8	104	9.3
1B	MLD	4-Pack	12.8	101	8.2
1C	MLD	6-Pack	11.6	124	11.0
2A	SFHD	47' x 85'	15.2	106	7.0
2B	SFHD	47' x 75'	10.2	71	7.0
3A	MLD	45' x 65'	14.2	132	9.4
3B	MLD	70' x 110'	6.5	25	3.9
4A	SF	65' x 105'	8.5	31	3.9
4B	SF	70' x 110'	19.2	63	3.7
5	SF	65' x 105'	9.9	38	3.9
6	SFHD	50' x 100'	16.5	99	6.0
7A	SF	75' x 110'	17.0	56	3.5
7B	SFHD/SF	60' x 110' and 75' x 100'	19.0	83	4.3
8A	SF	60' x 105' and 65' x 105'	24.9	104	4.3
8B	SF	70' x 100'	9.7	27	3.0
8C	SF	75' x 100'	29.3	96	3.3
9A	SF	70' x 110'	17.7	62	3.5
9B	SF	60' x 105'	21.5	102	4.9

General Plan, Specific Plan and Zoning Consistency

The 464.2-acre project site has General Plan land use designations of:
SF, SFHD, MLD, OS, PQP, P (Parks), and F (Fire Station). The Specific Plan adds the prefix of "SP" in front of the General Plan land use designations. The table below demonstrates the Toll Brothers at Alder Creek project's consistency with currently approved designations.

Land Use	FPASP Approved	VTM Proposed	Variance
SF	171.5	171.1	-0.4
SFHD	56.2	54.6	-1.6
MLD	53.9	52.2	-1.7
Park	10.3	13.6	+3.3
PQP	10.0	10.0	0.0
OS	131.2	137.1	+ 5.9
OS-LC	9.8	10.4	+ 0.6
ROW	21.3	18.8	-3.0

For a FPASP lot by lot ID# comparison of the minor variances between acreages, please refer to the tables contained within the Minor Administrative Modification exhibit submitted with this application.

Oddly, the Fire Station location and its land use designation are omitted in the Specific Plan Land Use Figure 4.2. Despite the omission, a 2.1-acre fire station site has been reserved in the preferred location identified by Fire Chief Solak.

The Project is consistent with both the General Plan and Specific Plan land use designations, as single family attached, and single family detached residential units are identified as permitted land uses within the Specific Plan. Additionally, the project will be developed with a variety of residential densities between 3.0 and 11.0 dwelling units per acre as shown in the Residential Land Plan Overview Table. These land use densities are consistent with the allowable density ranges established by both the General Plan and the Specific Plan.

Project Site Description

The Project site consists of gently rolling terrain and includes annual grassland and oak woodland plant communities, each occupying roughly half of the site. An electric transmission powerline easement runs north-south dividing the property.

The project site has historically been used for cattle grazing, farming, and mining activities. A farmhouse and associated barns and outbuildings are located within the J&Z Property on the north-east end of the Project site. Several temporary construction trailers associated with other development within the FPASP are also staged on this property.

The surrounding properties are primarily undeveloped land currently and historically used for agriculture and livestock grazing. Biological resources on surrounding properties are similar to those found on the project site, with grassland primarily to the south and west and oak woodland to the north and east. To the northeast of the site, Alder Creek flows north and west through the FPASP. To the southeast of the project site, single family residential development is currently being constructed by Toll Brothers.

Development standards of the properties are governed by a plethora of approved Federal and State environmental permits for both the FPASP and the individual development project. Please refer to the approved permits that are within the City of Folsom's possession.

Environmental Permitting and CEQA

The Toll Brothers at Alder Creek project is part of the FPASP, which is covered by several federal and state permits and includes backbone infrastructure serving the entire Folsom Plan Area. Within the FPASP, the Toll Brothers at Alder Creek project spans five permit areas: Mangini Ranch, Alder Ranch (also known as Folsom 560 and Hillsborough), Carpenter Ranch, Javanifard and Zarghami Property (J&Z Property), and the Backbone Infrastructure.

Due to the careful and purposeful planning of this community, no additional CEQA analysis is required. The US Army Corps of Engineers has issued pre-construction compliance verification forms for each permit area; therefore, the Toll Brothers at Alder Creek project is in compliance with the FPASP.

Phasing of Development

The Toll Brothers at Alder Creek project is anticipated to be developed in three (3) main phases which can generally be described as follows.

Phase 1: Area west of Oak Avenue Parkway, east of the powerline corridor
Phase 2: Area east of Oak Avenue Parkway
Phase 3: Area west of the powerline corridor

Development phasing in this sense can be thought of more in terms of improvements (underground and roadways) and home construction opposed to mass grading. At this time, which is prior to preparation of full improvement plans, we estimate that approximately 2,700,000 cubic yards of soil must be moved to properly balance the project site. While it is conceivable that mass grading may occur in accordance with the anticipated phasing noted above, it is unlikely. Home construction however is anticipated to follow the phasing noted above.

Construction of land development improvements associated with each phase will begin with the necessary backbone improvements to service each phase or subphase of villages. Then, and perhaps concurrently, subdivision (in-tract) improvements will be constructed. This process will repeat until all required backbone and in-tract improvements have been completed to serve the entire project site.

It is important to recognize that the anticipated land development improvement phasing along with anticipated home construction phasing is not part of any project approval. The anticipated phasing is provided only as a courtesy to the City, and the City cannot condition Toll Brothers to construct in any particular order. Changes in the rate of home sales, general upturns and downturns in the economy, and a variety of other factors could affect the actual phasing and timing of construction activities.

Traffic / Access / Circulation

The FPASP established a series of plans and policies for the circulation system within the entire Plan Area. The circulation system was designed with a sustainable community focus on the movement of people and provides a number of mobility alternatives. The FPASP circulation plan evaluated regional travel, both in terms of connectivity and capacity as well as local internal connections and access. The circulation plan also addressed the concerns of regional traffic, while considering community-wide connectivity, alternative modes of travel, and the provision of complete streets.

The 2011 Folsom Plan Area Specific Plan Environmental Impact Report/Environmental Impact Statement included not only a detailed analysis of traffic-related impacts within the Plan Area, but also an evaluation of traffic-related impacts on the surrounding communities. In total, there are fifty-five (55) traffic-related mitigation measures associated with development of the FPASP which will be included as conditions of approval for the Toll Brothers at Alder Creek project. Included among the mitigation measures are requirements to: fund and construct certain backbone roadway improvements within the Plan Area, pay fair-share contribution for construction of off-site improvements, participate in the City's Transportation System Management Fee Program, and Participate in the U.S. Highway 50 Corridor Transportation Management Association. The Toll Brothers project is expected to be subject to all traffic-related mitigation measures required by the FPASP EIR/EIS.

In 2025, Kimley-Horn completed a Traffic, Access, and Circulation Study for the Toll Brothers at Alder Creek project in compliance with the City's traffic study requirements. The primary purpose of the study is to inform and identify both the near-term and build-out transportation network necessary to accommodate the addition of the Toll Brothers at Alder Creek project. The evaluation was used to identify and document the required infrastructure and access improvements needed in both the Near

Term (2025 plus addition of the project) and at Specific Plan Build Out (2045 including addition of the project). The study further includes the considerations of the City's recent adoption of a round-about first policy.

The conclusions and results of the 2025 Kimley-Horn Traffic, Access, and Circulation Study can be found within the 209-page report that has been submitted in conjunction with the project application. Subsequent to traffic study submittal, the City additionally required Toll Brothers to pay for a "peer review" conducted by Fehr & Peers of the Kimley-Horn Traffic, Access, and Circulation Study. The conclusions of the peer review agreed with the findings in the Kimley-Horn study.

Oak Tree Preservation and Removal

The Toll Brothers at Alder Creek project contains both oak woodland areas and individual free-standing oak trees. An Arborist Report has been prepared by ECORP Consulting who has vast experience with the FPASP, and was submitted with the application materials. The purpose of the Arborist Report is to quantify the amount of oak woodland area within the project area and provide an assessment of the size and health condition of the individual trees.

There are 73 isolated oak trees on the project site, and oak woodland areas up to an estimated maximum of 107 acres which includes the property boundaries, all grading slopes, plus a 20-buffer around and within the entire development area. Additional individual tree survey data will be collected as needed to support evaluation of individual tree impacts, and applications for tree work permits or tree removal permits.

The FPASP does acknowledge that development will result in "unavoidable impacts" to isolated oak trees and oak woodlands. The policies in the Specific Plan state that oak trees included in residential and non-residential development parcels are encouraged to be preserved wherever practical, provided preservation does not:

- Cause a reduction in the number of lots or a significant reduction in the size of residential lots.
- Require mass grading that eliminates level pads or requires specialized foundations.
- Require the use of retaining walls or extended earthen slopes greater than 4-feet in height, as measured from the bottom of the footing to the top of the retaining wall.
- Require the preservation of any trees certified by an arborist to be dead or in poor or hazardous or non-correctable condition or trees that pose a safety risk to the public.
- Cost more to preserve the tree than to mitigate for its loss, based on the isolated oak tree mitigation requirements of the plan.

The Toll Brothers at Alder Creek project has been, and will continue to be designed to meet all FPASP applicable objectives and every practical effort will be made to preserve oak woodlands and isolated oak trees within the development parcels.

Minor Administrative Modification and Land Use Exhibit

The Toll Brothers at Alder Creek project is proposing certain minor boundary modifications to the approved boundaries shown in the FPASP. While the FPASP presents a good model or starting point, the next level of detail has been undertaken to analyze and determine how the roadways need to function, how boundaries should be amended to meet certain objectives of the Plan, and what infrastructure is necessary to serve the development area. Accordingly, these minor adjustments have resulted in our request for a Minor Administrative Modification request.

Toll Brothers has submitted two separate documents to illustrate and detail these minor amendments. The Land Use Exhibit identifies each minor amendment by zoning designation, by acreage and pictorially. The MAM Exhibit identifies each minor amendment by FPASP Parcel ID, by acreage and pictorially. As depicted in the table below, the most significant acreage modifications (although minor in scope) are increases in Open Space by nearly 6 acres, increases in Landscape corridors, increases in Parklands and reduction in roadways. We believe these minor modifications comply with the intent of the Specific Plan, and in fact enhance the overall project site.

Land Use	FPASP Approved	VTM Proposed	Variance
SF	171.5	171.1	-0.4
SFHD	56.2	54.6	-1.6
MLD	53.9	52.2	-1.7
Park	10.3	13.6	+3.3
PQP	10.0	10.0	0.0
OS	131.2	137.1	+ 5.9
OS-LC	9.8	10.4	+ 0.6
ROW	21.3	18.8	-3.0

Walls and Fencing

The City of Folsom has an exterior noise level standard of (60 dB Ldn). The FPASP EIR/EIS addresses noise standards and in development areas where the noise levels of adjacent roadways may exceed the City's standard, mitigation measures are required. The required mitigation measures are widely known throughout the development community, and the Toll Brothers at Alder Creek project proposes to voluntarily implement those measures without having to prove the mitigation measures are necessary.

Therefore, the Toll Brothers at Alder Creek project proposes the following noise mitigation measures be implemented through a specific condition of approval.

1) Solid noise barriers or similar natural features (earthen berms, etc.) shall be constructed adjacent to Oak Avenue Parkway, Mangini Parkway, Street D, and Prairie City Road to reduce future traffic noise levels to below the City of Folsom exterior criteria of 60 dB Ldn at the proposed residential backyards. Barrier heights are specified relative to backyard elevations, and may vary from 6 feet to 8 feet in height depending on the backyard elevation relative to the adjacent roadway.

2) Mechanical ventilation (air conditioning) shall be provided for all residences within the Toll Brothers project to allow the occupants to close doors and windows as desired to achieve compliance with the applicable interior noise level criteria.

3) Second-floor windows of residences located adjacent to Prairie City Road shall have second-floor windows with a minimum STC (Sound Transmission Class) rating of 34.2.

A split-face block wall is proposed around the perimeter of the project except at locations adjacent to open space. Generally, these walls will be 6 feet in height but increasing up to 8 feet in height to implement recommended noise reductions measures.

Private yard areas for the individual residential lots are proposed to be screened by a combination of wood fencing, open-view tubular steel fencing, and masonry walls. The wood fencing will be utilized for the interior side yards, street side yards, and rear yards of the residential lots. The open-view tubular steel fencing will be utilized for the rear yards on residential lots located adjacent to open space areas

(where noise mitigation is not required). Masonry walls will be installed at various locations throughout the project site to minimize potential noise and privacy concerns.

Homeowners Associations

The Toll Brothers at Alder Creek community will be divided into two distinct Homeowners' Associations (HOAs). One located in the north-west portion of the project site, south of Alder Creek Parkway, west of Oak Avenue, and north of Street D (Specific Plan Parcel ID #58), will be a gated neighborhood, temporarily named the Gated HOA. A second HOA located in the east and west portion of Oak Avenue extending up to east and west of Oak Avenue and north of Mangini Parkway extending up to east of the Powerline contains Specific Plan Parcel numbers 19A, 19B, 20A, 23-27, 173 and 254-256, which will not be gated, will fall under its own HOA, temporarily named the Non-Gated HOA. These two HOAs will be established in accordance with the California Davis-Stirling Common Interest Development Act and will operate as California nonprofit mutual benefit corporations.

List of Improvements HOA will cover

The **Gated HOA** will be responsible for maintaining the entry gates, parks, and internal landscape corridors. The community will feature two gated entries into this portion of the community, one located south of Alder Creek Parkway on the north side of the property, and the other located north of Haven Parkway at the south end of the property. Each of these gates will include two interior landscaped corridors, bringing the total to four landscaped buffer areas within the community. These corridors will enhance the aesthetic appeal and provide a green buffer between the gate system and residential areas. The HOA will maintain the gates, sidewalks, and roadways, while the City will own and maintain the underground utilities.

A 51.4-acre open space Oak Woodland preserve area (Specific Plan Parcel ID #103) spans the heart of the community, which will provide a natural setting for residents, and ultimately contain a Class 1 Pedestrian Trail that will be constructed and maintained by the City through the collection of Specific Plan Impact Fees. The 51-acre Oak Woodland preserve area will endure in its natural state, and not be maintained by the Gated HOA.

Within the Gated HOA, there will be three designated private mini parks of approximately one-half acre each, along with two paseos connecting to the future Class 1 pedestrian trails that will serve as recreational spaces for residents. The HOA will be responsible for maintaining the mini parks and paseos to ensure their long-term upkeep and accessibility for residents. The Gated HOA will also oversee the surface improvements of private streets, ensuring their maintenance and upkeep while coordinating with the City on any necessary underground maintenance. Access will be granted to the City and other governmental agencies, utility companies, etc. through a series of easements, ROW's, etc., dedicated at the time of Small Lot Final Map(s). Residents outside of the Gated HOA will be able to access the public trail system that passes through the area via the paseos, which will remain ungated.

The **Non-Gated HOA** will serve as a vibrant and well-maintained community, offering a variety of amenities and services exclusively for its residents. The residential component of the community will consist of a thoughtfully designed mix of housing types, catering to a variety of homebuyers. The plan includes 6-pack homes**,** 4-pack homes, duet homes and single-family homes of varying lot sizes. This diverse range of home designs will provide options for different household sizes and preferences while maintaining a cohesive architectural style. The community amenity labeled as "Private Park" will be developed as a central gathering space for homeowners in this community. The "Private Park" will feature amenities such as a swimming pool, restrooms, spa, and showers, and will be owned and maintained by the Non-Gated HOA. Access to this facility will be restricted to residents of the Non-Gated HOA, ensuring it remains exclusive to its members. In addition to the "Private Park," the maintenance of

the interior landscaped corridors near the 4- and 6-pack homes will also fall under the responsibility of the Non-Gated HOA. The 4-pack homes will include planter strips and sidewalks, which the Non-Gated HOA will maintain.

The Non-Gated community will also include multiple mini parks maintained by the HOA, and a private park maintained by the HOA offering ample open space for recreation, relaxation, and social interaction. The mini parks have been incorporated to promote community interaction and socialization. The HOA will support homeowner connections by organizing community events like Easter egg hunts, ice cream socials, outdoor movie nights (strictly complying with noise ordinances of course), holiday light contests, etc. The FPASP public neighborhood park adjacent to the elementary school, will also offer all residents access to additional recreational opportunities. The proximity of the school to the residential areas will provide convenience for families with children and foster a strong connection between the neighborhood and educational institutions. The school district will be responsible for owning and maintaining the school, while the City will own and maintain the neighborhood public park.

Inclusionary Housing Agreement

On January 13, 2026, the City amended the Folsom Municipal Code relating to Inclusionary Housing. As described in Section 17.104 of the Code, there are several methods to meet the inclusionary housing requirement, including payment of in-lieu fee. Accordingly, Toll Brothers elects to rely on this section of the Code utilizing the payment of in-lieu fees to satisfy its inclusionary housing requirement.

Home Architecture

Toll Brothers and the City have discussed the standard tentative map submittal requirement of full building elevation plans, color and material boards, colored renderings, monumentation signage renderings, etc., as described in Section 13.4 of the FPASP. Both parties have agreed to forgo these required submittals with the Toll Brothers at Alder Creek Vesting Small Lot Tentative Map for the following reasons.

The standard architectural submittals make sense for a standard tentative map application with a substantially smaller dwelling unit count. However, the duration of time between tentative map submittal, preparation and approval of improvement plans, physical development of the property, etc., is vast. Developing architecture for 1,424 units containing twelve (12) different lot sizes, with each of the twelve lot sizes containing multiple home plans prior to the submittal of the vesting tentative map is simply premature. Toll Brothers takes great care, and performs extensive due diligence in developing our home architecture, and to artificially force the completion of architecture years before the first building permit is even applied for simply to check a box on an application form isn't rational. Toll Brothers extends its appreciation to the City for recognizing these facts, and allowing us to forgo this standard requirement at the time of tentative map submittal.

Given this mutual understanding with the City, Toll Brothers will fully comply with all City design review requirements and commits to securing Design Review Committee approval prior to submitting master-plan home construction drawings to the City's Building Department for review. We anticipate this requirement will be made one of the conditions to the vesting tentative map approval.

As a further gesture of Toll Brothers appreciation of the City's reasonableness, we have developed preliminary architecture themes, design objectives, architectural styles, homesite examples, and a set of development standards for the City's review. These items are contained within the document titled Toll Brothers at Alder Creek Design Guidelines submitted with the Small Lot Vesting Tentative Map application. One area of the project site that has garnered particular interest from Staff are the 4-Pack and 6-Pack areas of the land plan.

Included within the Toll Brothers at Alder Creek Design Guidelines document are specific setback standards for the 4-Pack and 6-Pack homesites that are expressly part of the Planned Development Permit portion of the overall application. Toll Brothers is seeking approval of these setbacks as part of the PD and VTM application.

4-Pack and 6-Pack Land Use Pattern Description

The southeast portion of the Vesting Tentative Map has a Specific Plan zoning designation of Multi-Family Low Density (MLD) with a required density of 7-12 DU/Ac. Toll Brothers has carefully designed this area of the project (Specific Plan Parcel ID's of 24 and 173) to comply with the zoning designations. The lotting patterns in this area are commonly referred to a 4-Pack and 6-Pack designs. The 4-Pack and 6-Pack lotting patterns are identified on the Vesting Tentative Map as Villages 1B and 1C respectively.

Although these lotting patterns may not be common or familiar to the City of Folsom, they are employed widely throughout the country, and Toll Brothers has built a multitude of desirable and successful communities utilizing this pattern, and we have included photographs of actual Toll Brothers homes for reference in this application. It is also worth noting that the use of these lot types not only allows for the higher density required by the zoning designation, but also allows us to introduce a more affordable product in an area that is highly desired by first-time or entry-level homebuyers.

Because these design patterns may not be common or familiar to the City of Folsom, we have prepared not only a design guideline table, but also made the effort to prepare a colored graphic to further assist the City with understanding how these lotting patterns work. Both the guidelines table and color graphic can be found on the following pages.

The 4-Pack pattern is designed to have the two (2) homes closest to the primary neighborhood roadway facing the primary neighborhood roadway, providing a traditional look and feel. Employing these extra design elements will make the homesites comparable to a more traditional residential design. The two (2) remaining homes in the 4-Pack pattern will face the motor-court as is standard with this type of land use. The 6-Pack pattern has been designed with a standard configuration with all homes facing the motor-court. This configuration presents its own unique needs for relief and space planning, and we will incorporate the use of street trees, thoughtful planting, and attractive masonry wall (as opposed to traditional wood fencing) to elevate the aesthetic of the homesites with street frontage.

As is the norm with any "X-Pack" land plan design, there will be zero (0) lot line homesites with a use easement on the adjacent property, and Toll Brothers has also carefully prepared the design guidelines to ensure there remains a minimum separation between structures. Please refer to the design guideline tables and color graphics on the following pages to gain a better understanding of how the zero-lot line and building separation minimums function.

The motor-courts contained within both the 4-Pack and 6-Pack neighborhoods will be privately owned and maintained, enforced through a series of recorded Homeowners Association Use, and Maintenance Declarations, while the primary neighborhood roadways will remain public.

Landscape Design

Toll Brothers understands the importance of landscaping to any new community. A well designed and thoughtfully implemented landscape is central to achieving the visual and design aesthetic envisioned for Toll Brothers at Alder Creek. Accordingly, and in compliance with the FPASP, we have prepared a set of Landscape Design Guidelines that include the following primary representations. Location & Setting, Project Vision, Streetscape, Master Plant List, Gated Entry Monumentation, and Site Amenities. The

Landscape Design Guidelines are included as a separate document within the overall application. Please refer to these guidelines for detail and approval.

Summary

Toll Brothers is requesting approval of a Small Lot Vesting Tentative Map, Planned Development Permit, Design Guidelines, and Minor Administrative Modification containing 1,424 single family dwelling units with varying densities covering 464.2 acres. A variety of other parcels are also included for land uses such as private recreation, parks, landscaping, open space, roadways, a fire station, and an elementary school. In total, 1,488 total lots will be created.

Should anyone reading this Project Narrative not already be familiar with Toll Brothers and the high-quality developments we create, we encourage you to visit our Regency at Folsom Ranch project within the FPASP. For even more information on Toll Brothers commitment to quality and to see real life examples of the type of communities and homes we build here in Folsom and nationwide, please visit our website at www.tollbrothers.com

Finally, while we recognize municipalities typically do not consider financial investment or time investment into a community, Toll Brothers investment into the City of Folsom for this proposed project is very substantial from both perspectives. Irrespective of the property tax revenue this project will generate, the employment it will generate, the local business revenue it will generate (all of which are substantial in their own right), the impact fees and building permit fees alone that will be paid to the City of Folsom are estimated to be over $130,000,000. This project will also extend our already strong relationship with the City by 10 (+/-) years. These financial and relationship realities demonstrate Toll Bothers commitment to this project and investment within the City of Folsom.

Attachment 20

Alder Creek Conformity Analysis with Appendices, date November 19, 2025

Section 15182 and 15162 Conformity Analysis for the Toll Brothers Property, Alder Creek Subdivision Tentative Map, City of Folsom, California

Lead Agency:

City of Folsom
50 Natoma Street
Folsom, CA 95630

Prepared by:

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS
2525 Warren Drive
Rocklin, CA 95677

August 2025

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City of Folsom, 2011.

Appendix B – *Alder Creek Property Project Emissions Report*
ECORP Consulting, Inc. July 2025.

Appendix C – *Alder Creek Property Project Roadway Construction*
ECORP Consulting, Inc. July 2025.

Appendix D – *Alder Creek Property Project Traffic Noise Levels*.
ECORP Consulting, Inc. July 2025.

Appendix E – *Prairie City Road Phase 1 Improvements and Interim Connections*.
MacKay & Somps. August 2025.

LIST OF ACRONYMS AND ABBREVIATIONS

Term	Definition
AB 52	Assembly Bill 52
AQMP	Air Quality Management Plan
BACT	Best Available Control Technology
BB IS/MND	Backbone Initial Study/Mitigated Negative Declaration
BMPs	Best Management Practices
BP	Before Present
CAAQS	California Ambient Air Quality Standards
CAL FIRE	California Department of Forestry and Fire Protection
CalEEMod	California Emissions Estimator Model
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Standards Code
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	Methane
CHP	California Highway Patrol
City	City of Folsom
CIWM	California Integrated Waste Management
CNEL	Community Noise Equivalence Levels
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
COC	Chemical Of Concern
CRHR	California Register of Historic Resources
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibels

Term	Definition
DHS	California Department of Health Services
DOC	California Department of Conservation
DPM	Diesel Particulate Matter
DTSC	Department of Toxic Substances Control
ECORP	ECORP Consulting, Inc.
EID	El Dorado Irrigation District
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEIR	Final EIR
FHSZ	Fire Hazard Severity Zone
FHWA	Federal Highway Administration
FPASP	Folsom Plan Area Specific Plan
FTA	Federal Transit Administration
GHG	Greenhouse Gas
HCP	Habitat Conservation Plan
hp	Horse Power
HPMP	Historic Property Management Plan
HVAC	Heating, ventilation, and air conditioning
IS	Initial Study
ITE	Institute of Traffic Engineers
J&Z	Javanifard and Zarghami
mg/L	milligrams per liter
MLD	Most Likely Descendent
MMRP	Mitigation Monitoring and Reporting Plan
MND	Mitigated Negative Declaration
MRZ	Mineral Resource Zone
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NIOSH	National Institute for Occupational Safety and Health

Term	Definition
NOA	Naturally Occurring Asbestos
NOD	Notice of Determination
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	Ozone
OPR	California Office of Planning and Research
OS	Open Space
PA	Programmatic Agreement
PEA	Preliminary Environmental Assessment
PM	Post Mile
PM_{10}	Particulate matter with a diameter of 10 microns or less
$PM_{2.5}$	Particulate matter with a diameter of 2.5 microns or less
ppm	parts per million
PQP	Public Quasi-Public
PRC	Public Resources Code
Proposed Project	Alder Creek Elementary School Project
RDMD	Rhoades' Diggings Mining District
ROG	Reactive Organic Gases
RPA	Registered Professional Archaeologist
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SCH	State Clearinghouse
SFHD	Single Family High Density
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMARA	Surface Mining and Reclamation Act of 1975
SO_2	Sulfur Dioxide
SPA	Specific Plan Area

Term	Definition
SRCSD	Sacramento Regional County Sanitation District
SRWTP	Sacramento Regional Wastewater Treatment Plant
STC	sound transmission class
SVAB	Sacramento Valley Air Basin
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
USACE	United States Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VdB	vibration decibels
VTM	Vesting Tentative Map
WTP	Water Treatment Plant
WTP	Wastewater Treatment Plant

1.0 BACKGROUND

1.1 Summary

Project Title:	Toll Brothers Property – Alder Creek Subdivision Tentative Map Conformity Analysis
Lead Agency Name and Address:	City of Folsom 50 Natoma Street Folsom, CA 95630
Contact Person and Phone Number:	Jessica Brandt, Principal Planner (916) 461-6207 jbrandt@folsom.ca.us
Project Description Summary:	The Project proposed by Toll Brothers (applicant) is requesting approval of a Small Lot Vesting Tentative Map, Planned Development Permit, Design Guidelines, Landscape Guidelines, and Minor Administrative Modification containing 1,424 single family dwelling units with varying densities covering 464.2 acres. A variety of other parcels are also included for land uses such as private recreation, parks, landscaping, open space, roadways, a fire station, and an elementary school. In total, 1,488 total lots will be created.

1.2 Introduction

The City of Folsom is the Lead Agency for this California Environmental Quality Act (CEQA) Conformity Analysis. This Conformity Analysis has been prepared to identify and assess compliance of the Alder Creek Subdivision Tentative Map Project (Proposed Project) with the program-level Folsom Plan Area Specific Plan (FPASP) Environmental Impact Report/Environmental Impact Statement (EIR/EIS, State Clearinghouse [SCH]# 2008092051). This Conformity Analysis also satisfies CEQA (Public Resources Code [PRC], Section 21000 et seq.) and state CEQA Guidelines (Title 14, California Code of Regulations [CCR] 15000 et seq.). CEQA requires that all state and local government agencies consider the environmental consequences before approving projects.

Pursuant to CEQA Guidelines Section 15182(c), where a public agency has prepared an EIR on a specific plan after January 1, 1980, a residential project undertaken pursuant to and in conformity to that specific plan is exempt from CEQA if the project meets the requirements of this section. Residential projects covered by this section include but are not limited to land subdivisions, zoning changes, and residential planned unit developments.

If after the adoption of the specific plan, an event described in Section 15162 occurs, the exemption in this subdivision shall not apply until the city or county which adopted the specific plan completes a

subsequent EIR or a supplement to an EIR on the specific plan. The exemption provided by this section shall again be available to residential projects after the Lead Agency has filed a Notice of Determination on the specific plan as reconsidered by the subsequent EIR or supplement to the EIR.

2.0 PROJECT DESCRIPTION

2.1 Project Description

The Project proposed by Toll Brothers (applicant) is requesting approval of a Small Lot Vesting Tentative Map, Planned Development Permit, Design Guidelines, Landscape Guidelines, and Minor Administrative Modification containing 1,424 single family dwelling units with varying densities covering 464.2 acres. A variety of other parcels are also included for land uses such as private recreation, parks, landscaping, open space, roadways, a fire station, and an elementary school. In total, 1,488 total lots will be created. The Project is part of the FPASP, which is covered by several federal and state permits and includes backbone infrastructure serving the entire Folsom Plan Area. Within the FPASP, the Toll Brothers at Alder Creek project spans five permit areas: Mangini Ranch, Alder Ranch (also known as Folsom 560 and Hillsborough), Carpenter Ranch, Javanifard and Zarghami Property (J&Z Property), and the Backbone Infrastructure. Table 2.1-1 below shows the Vesting Small Lot Tentative Map Land Use Summary. A figure of the Project Location is found on Figure 2-1.

Table 2.1-1. Vesting Small Lot Tentative Map Land Use Summary	
Total Acreage	464.2
Dwelling Units	1,424
Number of Parks	10.0
Park Acreage	13.8
Number of Open Space Lots	16.0
Open Space Acreage	137.1
Major Roadway Acreage	19.7
Number of Roadway Landscape Lots	21.0
Roadway Landscape Acreage	10.7
Number of Village Landscape Lots	23.0
Fire Station Acreage	1.9
Elementary School Acreage	10.0

2.1.1 Residential Land Plan Overview

The Vesting Small Lot Tentative Map contains 1,424 residential lots with varying zoning densities. Toll Brothers have designed the Map in a concerted effort to accommodate a wide variety of housing types and price points. In total, there are thirteen (13) different lot sizes, each of which comply with the zoning designations and densities identified in the General Plan and the Specific Plan. The summary of each lot size, type, zoning designation and density can be found in Table 2.1-2 below. Net density is calculated using gross acreage, as required by the Specific Plan.

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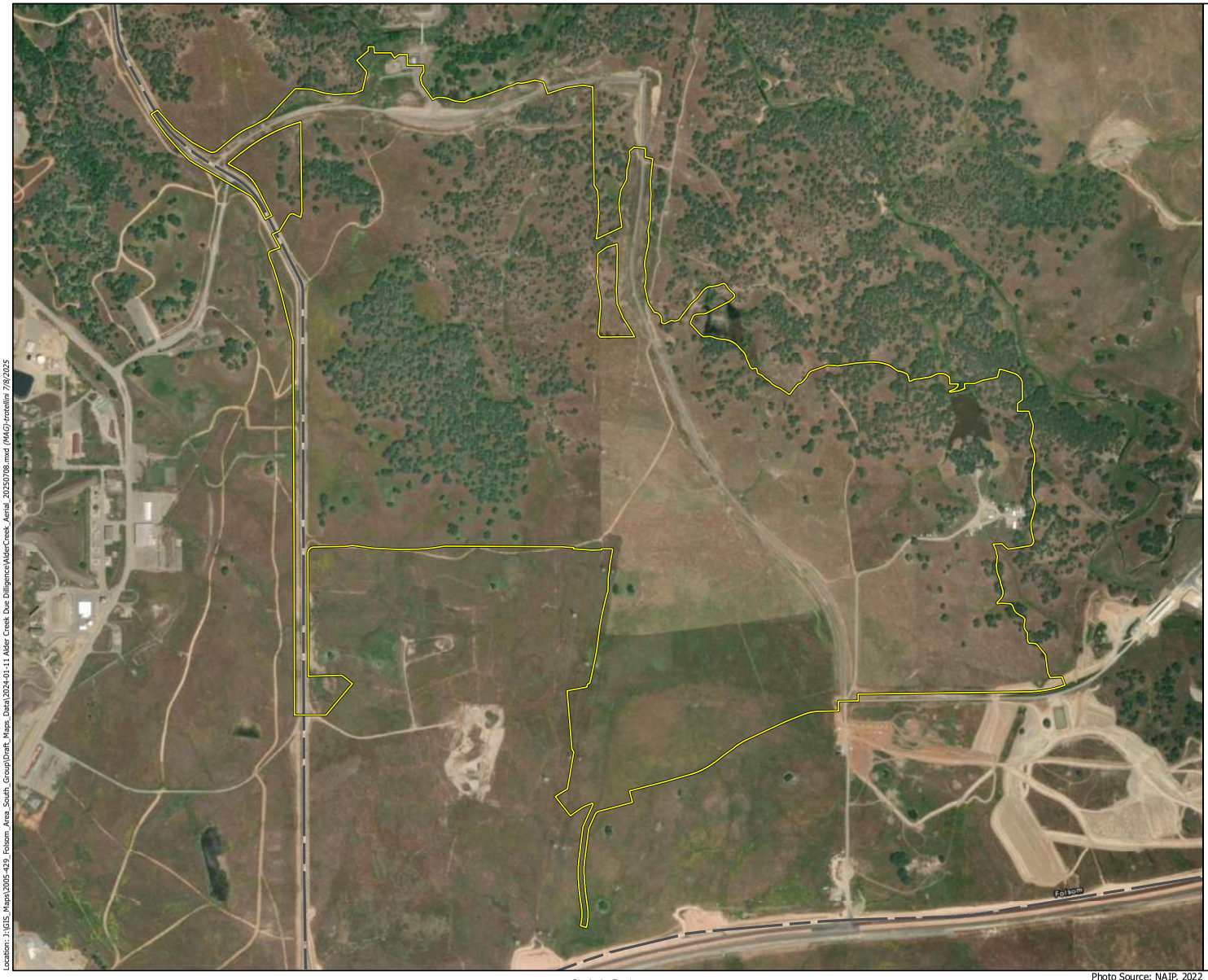
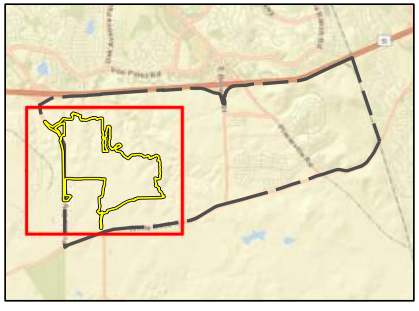


Figure 2-1.
Alder Creek Aerial

Map Features

- Specific Plan Boundary
- Alder Creek Project Area - 517.37 acres

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

2024-012 Alder Creek

Scale in Feet
0 700

Photo Source: NAIP, 2022
[1] ECORP, MSCE and Foothill Associates

Map Date: 7/8/2025

Location: J:\GIS_Maps\2005-429_Folsom_Area_South_Group\Draft_Maps_Data\2024-01-11 Alder Creek Due Diligence\AlderCreek_Aerial_20250708.mxd (MAG)-trotellim 7/8/2025

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Table 2.1-2. Residential Land Plan Overview					
Tentative Map Village Number	**Zoning Designation**	**Lot Size**	**Gross Acres**	**Dwelling Units**	**Net Density**
1A	MLD	42' x 65' Duets	12.8	106	8.3
1B	MLD	4-Pack	12.8	101	7.9
1C	MLD	6-Pack	11.6	124	10.7
2A	SFHD	47' x 85'	13.2	93	7.0
2B	SFHD	47' x 75'	10.2	71	7.0
3A	MLD	45' x 65'	14.2	132	9.2
3B	MLD	70' x 110'	6.5	25	3.8
4A	SF	65' x 105'	8.5	31	3.6
4B	SF	70' x 110'	19.2	63	3.3
5	SF	65' x 105'	11.9	47	4.0
6	SFHD	50' x 100'	16.5	99	6.0
7A	SF	75' x 110'	17.4	58	3.3
7B	SFHD/SF	60' x 110' and 75' x 100'	18.6	81	4.4
8A	SF	60' x 105' and 65' x 105'	24.9	105	4.2
8B	SF	70' x 100'	9.8	27	2.8
8C	SF	75' x 100'	29.3	96	3.3
9A	SF	70' x 110'	17.7	62	3.5
9B	SF	60' x 105'	21.5	103	4.8

Note: MLD = Multi-Family Low-Density; SF = Single-Family; SFHD = Single-Family High Density;

2.1.2 General Plan, Specific Plan, and Zoning Consistency

The 464.2-acre project site has General Plan land use designations of: SF, SFHD, MLD, OS (Open Space), PQP (Public Quasi-Public), P (Parks), and F (Fire Station). The Specific Plan adds the prefix of "SP" in front of the General Plan land use designations. Table 2.1-3 below demonstrates the Toll Brothers at Alder Creek project's consistency with currently approved designations.

Table 2.1-3. Project Changes in Acreages			
Land Use	**FPASP Approved**	**VTM Proposed**	**Variance**
SF	171.5	171.1	-0.4
SFHD	56.2	54.6	-1.6
MLD	53.9	52.2	-1.7
P	10.3	10.0	-0.3
PQP	10.0	10.0	0.0
OS	131.2	137.1	5.9
OS-LC	9.8	10.4	0.6
ROW	21.3	18.8	-3.0

Note: FPASP = Folsom Plan Area Specific Plan; MLD = Multi-Family Low Density; P = Parks; PQP = Public/Quasi-Public; OS = Open Space; OS-LC = ; ROW = Right-of-Way; SF = Single Family; SFHD = Single Family High Density; VTM = Vesting Tentative Map

2.1.3 Prairie City Road Improvements

The FPASP identifies the southern section of Prairie City Road (from Alder Creek Parkway south to White Rock Road) as a required four lane minor arterial, two lanes in each direction (north-south) with a planted median and landscape corridor. Part of the proposed Project includes construction of Phase 1 of Prairie City Road improvements, consisting of the easterly travel lanes in the ultimate and final alignment, sidewalk and landscape corridor. This work would include rough grading, rail corridor crossings and installation of pavement, curbs, gutters, street lighting, sidewalks, landscaping and striping. These construction specifications shall be consistent with Figure 7.9 of the FSPASP. The design drawings have been included in Appendix E. The Prairie City Road improvements that are part of the proposed Project are within the existing CWA Section 404 permit boundaries.

As part of the improvements to Prairie City Road, the proposed 69-kilovolt (kV) transmission lines will be realigned to the western side of Prairie City Road. The line relocation work would occur in the area along Prairie City Road already included in the project permitting.

2.2 California Environmental Quality Act Compliance

CEQA applies to proposed projects initiated by, funded by, or requiring discretionary approvals from state or local government agencies. As such, the proposed project constitutes a project as defined by CEQA (California Public Resources Code, Section 21000 et seq.). CEQA Guidelines Section 15367 states that a "Lead Agency" is "the public agency which has the principal responsibility for carrying out or approving a project." Therefore, the City of Folsom (City) is the lead agency responsible for compliance with CEQA for the proposed project.

An Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Folsom South of U.S. Highway 50 Specific Plan Project was prepared jointly by the City of Folsom and U.S. Army Corps of Engineers (USACE) to fulfill requirements of the California Environmental Quality Act (CEQA) and National

Environmental Policy Act, respectively. A Notice of Determination (NOD) for the EIR was filed by the City of Folsom on June 15, 2011 (State Clearinghouse [SCH] #2008092051), and a Record of Decision for the EIR/EIS was filed by the USACE on August 12, 2011, (SPK-2007-02159). A Mitigation Monitoring and Reporting Program (MMRP) was prepared and adopted with the FPASP and is a binding document applicable to the Alder Creek Property development (Appendix A, Mitigation Monitoring and Reporting Program). The approved MMRP outlines mitigation measures required for all projects located within the FPASP.

An Initial Study (IS) and Mitigated Negative Declaration (MND) was prepared for the FPASP Backbone Infrastructure (BB IS/MND), and an NOD was filed by the City of Folsom on February 25, 2015 (SCH# 2114122018). The BB IS/MND outlines mitigation measures specifically for the Backbone Infrastructure development. The mitigation measures in the BB IS/MND mirror the original EIR/EIS with some modifications.

This Conformity Analysis has been prepared to examine the project in light of the FPASP EIR/EIS (City of Folsom 2011), pursuant to CEQA Guidelines Section 15182, to determine if any of the events described in CEQA Guidelines Section 15162 have occurred, and were not considered in the FPASP. The background information referenced in this document is from information contained in that document.

2.2.1 Overview of CEQA Guidelines Section 15182

The CEQA Guidelines section 15182(c) states that "Where a public agency has prepared an EIR on a specific plan after January 1, 1980, a residential project undertaken pursuant to and in conformity to that specific plan is exempt from CEQA if the project meets the requirements of this section. Residential projects covered by this section include but are not limited to land subdivisions, zoning changes, and residential planned unit developments." The 15182 exemption shall not apply if an event described in Section 15162 occurs, which includes the following circumstances:

"(1) substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;

(2) substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or Negative Declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or

(3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the Negative Declaration was adopted, shows any of the following:

A. The project will have one or more significant effects not discussed in the previous EIR or negative declaration;
B. Significant effects previously examined will be substantially more severe than shown in the previous EIR;

C. Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or
D. Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative."

For purposes of this analysis, however, because the proposed project implements and is consistent with the FPASP, and none of the factors set forth in CEQA Guidelines Section 15162 are present or have been identified, pursuant to CEQA Guidelines Section 15182, the City finds that the project is exempt from further CEQA compliance. The City further finds that the project is also exempt pursuant to Government Code Section 65457.

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3.0 CONFORMITY ANALYSIS

3.1 Aesthetics

3.1.1 Environmental Setting

The Project is located within the City of Folsom Plan Area in eastern Sacramento County. The Plan Area is generally bounded by U.S. Highway 50 to the north, White Rock Road to the south, Prairie City Road to the west, and the Sacramento/El Dorado County line to the east. It is located partially within the Sierra Nevada foothills and partially within the eastern edge of the Sacramento Valley. The Sierra Nevada foothills consist of gently rolling terrain that grades upward to the east into the higher mountain elevations. The Sacramento Valley is a nearly flat alluvial plain that extends almost 180 miles from the Sacramento-San Joaquin Delta on the south to the city of Redding on the north, and approximately 50 miles from the Sierra Nevada mountains on the east to the Coast Range on the west.

Urbanized development within the City of Folsom exists north of U.S. 50. The urban areas consist of large residential and commercial developments. Neighborhoods and shopping centers are generally concentrated along major roadways and are separated by areas of open space. Land south of U.S. 50 was historically characterized by seasonal grazing land. Since implementation of the FPASP EIR/EIS, the area has been developed to include a mix of residential units and graded sites proposed for future residential and commercial uses. The El Dorado County line forms the eastern boundary of the City of Folsom. The Stonebriar subdivision is located east of the County boundary in the community of El Dorado Hills. Industrial land owned by GenCorp and associated buffer lands are located to the west of Prairie City Road.

3.1.1.1 Regional Setting

State Scenic Highways

The California Scenic Highway Program protects and enhances the scenic beauty of California's highways and adjacent corridors. The California Department of Transportation (Caltrans) can designate a highway as scenic based on how much natural beauty can be seen by users of the highway, the quality of the scenic landscape, and if development impacts the enjoyment of the view. There are no officially designated scenic highways within or near the Project Site.

Scenic Resource Designations

Scott Road, from White Rock Road south to Latrobe Road, is a designated scenic corridor in the Sacramento County General Plan. While this portion of Scott Road is not located within the Folsom Plan Area, the Plan Area is visible from the scenic corridor. According to the Scenic Highways Element of the Sacramento County General Plan, the visual character of the roadway was considered to be particularly scenic and thus warranted scenic corridor protection.

3.1.1.2 Visual Character of the Project Site

The Project site is located within the central lowlands of the Folsom Plan Area. Historically, the landscape of this portion of the Plan Area was characterized by gently rolling hills covered with annual grasses and scattered trees, water features, and rock outcroppings. Since the implementation of the FPASP EIR/EIS, foreground views consist of graded plots and construction activities for residential communities. Middle ground views consist of farmland to the south, oak woodlands to the west, the City of Folsom and U.S. 50 to the north, and the rolling hills within the Plan Area to the east. In the background, the Sierra Nevada mountains are visible to the east, and Mount Diablo is within view to the southwest.

3.1.2 FPASP EIR/EIS Summary

According to the FPASP EIR/EIS, implementation of mitigation measures would reduce impacts associated with new light and glare to a less than significant level. Impacts related to substantial alteration of a scenic vista, damage to designated scenic corridor, and substantial degradation of visual character due to development would be significant and unavoidable because no feasible mitigation measures are available to reduce these impacts to a less than significant level.

3.1.3 Aesthetics Conformity Analysis

3.1.3.1 Scenic Vistas

Project implementation would have no substantial change to aesthetic environmental checklist items described in the FPASP EIR/EIS. Planned development has been approved and built adjacent to the Project site. Impacts to scenic vistas were identified as a significant and unavoidable impact in the FPASP EIR/EIS and the Project does not introduce any new or unique visual features that were not analyzed in the FPASP EIR/EIS. No new circumstances or Project changes have occurred nor has any new information been found requiring new analysis or verification on scenic vistas. Therefore, the Proposed Project would have no new impact on scenic vistas.

3.1.3.2 Scenic Resources

At the time of the certification of FPASP EIR/EIS, there were no officially designated State Scenic Highways with views of the site. However, Scott Road south of White Rock Road was identified as a designated scenic corridor in Sacramento County because it is considered to be located within an especially scenic rural portion of Sacramento County. It continues to remain a designated scenic corridor; therefore, the same visual impacts to this corridor would occur with implementation of the Project as described in the FPASP EIR/EIS. Because the Project would develop the site with a similar development pattern and land uses as described in the FPASP EIR/EIS, no new impacts would occur. The findings of the certified EIR/EIS remain valid, and no further analysis is required. Therefore, the Proposed Project would have no new impact on state scenic highways or corridors.

3.1.3.3 Visual Character

The Project is part of the greater implementation of the FPASP, resulting in the conversion of grassy hillsides to urban areas generally consisting of housing units and commercial developments. The Project would affect the same area analyzed for development in the FPASP EIR/EIS and would not alter the development type or density at the Project site. Development surrounding the Project site is ongoing, so the visual character of the site and surrounding area will not be significantly impacted by Project implementation. Therefore, the visual character of the site and surroundings will not change, and the findings of the certified EIR/EIS remain valid and no further analysis is required. No new impact would occur.

3.1.3.4 Light and Glare

To minimize potential light and glare impacts, the Proposed Project would be consistent with FPASP development standards that address street and outdoor lighting. Therefore, the proposed Project would increase severity of impacts related to light and glare beyond those previously identified and analyzed in the FPASP EIR and the Backbone Infrastructure Initial Study. No new impact would occur.

3.1.4 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan Final EIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan Final EIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.
7. The FPASP EIR/EIS included seven mitigation measures (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to aesthetic resources that the proposed Project would have to adhere to.

3.2 Agriculture and Forestry Resources

3.2.1 Environmental Setting

The California Department of Conservation manages the Farmland Mapping and Monitoring Program, which identifies and maps significant farmland. Farmland is classified using a system of five categories including Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, and Grazing Land. The classification of farmland as Prime Farmland, Unique Farmland, and Farmland of Statewide Importance is based on the suitability of soils for agricultural production, as determined by a soil survey conducted by the Natural Resources Conservation Service. The California Department of Conservation manages an interactive website, the California Important Farmland Finder. This website identifies the Project site as being outside of the survey area and therefore not considered to be agriculturally important land.

The California Department of Conservation (DOC) identifies the Project site as Grazing Land (DOC 2022). After adoption of the FPASP, the Project site is not intended for agricultural uses and contains no forest or timber resources, is not zoned for forestland protection or timber production. The Project site is not located adjacent to or within the vicinity of any farmland.

3.2.2 FPASP EIR/EIS Summary

Impacts to Agriculture resources was combined with impacts to Land Use in the FPASP EIR/EIS. According to the FPASP EIR/EIS, impacts related to the cancellation of existing on-site Williamson Act contracts to accommodate the FPASP development would be significant and unavoidable and no feasible mitigation measures are available to reduce impacts to a less than significant level. In addition, FPASP implementation could conflict with previously existing off-site Williamson Act contracts or result in the cancellation of such contracts on lands south of the Specific Plan Area (SPA) and no feasible mitigation measures are available to reduce this impact to a less than significant level.

3.2.3 Agriculture and Forestry Resources Conformity Analysis

The proposed Project site is located within the FPASP and is not used for agriculture. Thus, the proposed Project would have no impacts on agriculture or forestry resources. The proposed Project would neither result in new significant impacts nor substantially increase the severity of impacts related to agriculture and forestry resources beyond those previously identified and analyzed in the FPASP EIR/EIS. No new impacts would occur.

3.2.4 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.

2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.
7. The FPASP EIR/EIS included two mitigation measures (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to land use and agriculture resources that the proposed Project would have to adhere to.

3.3 Air Quality

3.3.1 Environmental Setting

The City of Folsom is located in Sacramento County. The California Air Resources Board (CARB) divides the State into air basins that share similar meteorological and topographical features. The City of Folsom portion of Sacramento County is located in a region identified as the Sacramento Valley Air Basin (SVAB). The SVAB is comprised all of Butte, Colusa, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba counties and parts of Solano and Placer County. The air basin is relatively flat, bordered by mountains to the east, west, and north and by the San Joaquin Valley to the south. Air flows into the SVAB through the Carquinez Strait, moving across the Sacramento Delta, and bringing pollutants from the heavily populated San Francisco Bay Area. The climate is characterized by hot, dry summers and cool, rainy winters. Characteristic of SVAB winter weather are periods of dense and persistent low-level fog, which are most prevalent between storm systems. From May to October, the region's intense heat and sunlight lead to high ozone pollutant concentrations. Summer inversions are strong and frequent but are less troublesome than those that occur in the fall. Autumn inversions, formed by warm air subsiding in a region of high pressure, have accompanying light winds that do not provide adequate dispersion of air pollutants.

Both the U.S. Environmental Protection Agency (USEPA) and CARB have established ambient air quality standards for common pollutants. These ambient air quality standards are levels of contaminants representing safe levels that avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover what are called "criteria" pollutants because the health and other effects of each pollutant are described in criteria documents. The six criteria pollutants are ozone (O_3), carbon monoxide (CO), particulate matter (PM), nitrogen oxides (NO_x), sulfur dioxide (SO_2), and lead. Areas that meet ambient air quality standards are classified as attainment areas, while areas that do not meet these standards are classified as nonattainment areas. The portion of Sacramento County encompassing the City of Folsom and the development site is designated as a nonattainment area for the

federal O_3 and fine particulate matter ($PM_{2.5}$) standards and is also a nonattainment area for the state standards for O_3 and coarse particulate matter (PM_{10}) (CARB 2023).

The Sacramento Metropolitan Air Quality Management District (SMAQMD) is the air pollution control agency for Sacramento County, including the development site. The agency's primary responsibility is ensuring that the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) are attained and maintained in the Sacramento County portion of the SVAB. The SMAQMD coordinates the work of government agencies, businesses, and private citizens to achieve and maintain healthy air quality for the Sacramento area. The SMAQMD develops market-based programs to reduce emissions associated with mobile sources, processes permits, ensures compliance with permit conditions and with SMAQMD rules and regulations, and conducts long-term planning related to air quality. The SMAQMD is also responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, awarding grants to reduce motor vehicle emissions, and conducting public education campaigns, as well as many other activities.

The following is a list of noteworthy SMAQMD rules that are required of construction activities associated with the Alder Creek Property development:

- **Rule 201: General Permit Requirements.** Any project that includes the use of equipment capable of releasing emissions to the atmosphere may require permit(s) from SMAQMD prior to equipment operation. The applicant, developer, or operator of a project that includes an emergency generator, boiler, or heater should contact the SMAQMD early to determine if a permit is required, and to begin the permit application process. Other general types of uses that require a permit include, but are not limited to, dry cleaners, gasoline stations, spray booths, and operations that generate airborne particulate emissions. Portable construction equipment (e.g., generators, compressors, pile drivers, lighting equipment, etc.) with an internal combustion engine over 50 horsepower is required to have a SMAQMD permit or a CARB portable equipment registration.
- **Rule 402: Nuisance.** The purpose of this rule is to limit emissions which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause or have natural tendency to cause injury or damage to business or property.
- **Rule 403: Fugitive Dust.** The purpose of this rule is to require that reasonable precautions be taken so as not to cause or allow the emissions of fugitive dust from non-combustion sources from being airborne beyond the property line from which the emission originates.
- **Rule 442: Architectural Coatings.** The purpose of this rule is to limit the emissions of volatile organic compounds from the use of architectural coatings supplied, sold, offered for sale, applied, solicited for application, or manufactured for use within the SMAQMD.

3.3.2 FPASP EIR/EIS Summary

According to the EIR/EIS, with implementation of mitigation measures, impacts would be reduced that are associated with temporary, short-term construction-related emissions of criteria air pollutants and precursors; long-term operation-related (regional) emissions of criteria air pollutants and precursors; exposure to TACs; and exposure to odorous emissions from construction activity; and exposure to odorous emissions from operation of the proposed corporation yard, but not to a less than significant level, because emissions and exposure levels would (or could potentially) still exceed applicable thresholds and, therefore, residual significant impacts would occur. All other air quality impacts were found to be less than significant

3.3.3 Air Quality Conformity Analysis

3.3.3.1 Air Quality Emissions Assessment

This information was obtained from Appendix B, the Alder Creek Property Emissions Report (ECORP Consulting, Inc. [ECORP] 2025a). The FPASP EIR/EIS addressed air quality issues related to the development of the entire FPASP, of which the Alder Creek Subdivision development is a part. The Alder Creek Subdivision development will be subject to the Mitigation Monitoring and Reporting Plan (MMRP) adopted for the Specific Plan, including implementation of mitigation measures required to reduce air quality impacts. The impact evaluation below utilizes the analyses completed in the EIR/EIS to determine the means of compliance with the EIR/EIS by the Alder Creek Subdivision development, or whether implementation of the Alder Creek Subdivision development would result in a new impact on air quality not previously addressed in the EIR/EIS or increase the severity of previously identified EIR/EIS impacts.

3.3.3.2 Methodology

Air pollutant emission impacts were assessed in accordance with methodologies recommended by the SMAQMD and the requirements of the FPASP EIR/EIS. Where criteria air pollutant quantification was required, emissions were modeled using the California Emissions Estimator Model (CalEEMod), version 2022.1. CalEEMod is a statewide land use emissions computer model designed to quantify potential criteria pollutant emissions associated with both construction and operations from a variety of land use projects. Construction-generated air pollutant emissions were calculated using CalEEMod model defaults for Sacramento County and information provided in the Project Description, such as the site acreage, lot acreages for each land use, and total amount of building square footage for the single-family homes. The fire station's building square footage was derived from the lot acreage provided and the building coverage provided in the City's Municipal Code Section 17.11.060, which allows for the development of 30 percent of the lot acreage. Operational air pollutant emissions were also calculated using CalEEMod model defaults and the information provided in the Project Description.

3.3.3.3 Conflict with Any Applicable Air Quality Management Plan

As part of its enforcement responsibilities, the USEPA requires each state with nonattainment areas to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the federal

standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution in nonattainment areas, using a combination of performance standards and market-based programs. Similarly, under state law, the California Clean Air Act requires an air quality attainment plan to be prepared for areas designated as nonattainment with regard to the NAAQS and CAAQS. Air quality attainment plans outline emissions limits and control measures to achieve and maintain these standards by the earliest practical date .

As previously described, the development site is located in the SVAB, which is under the jurisdiction of the SMAQMD. The SMAQMD is required, pursuant to the federal Clean Air Act, to reduce emissions of criteria pollutants for which the SVAB is in nonattainment. The SMAQMD is required to submit air quality plans and rate-of-progress milestone evaluations in accordance with the federal Clean Air Act. The SMAQMD air quality attainment plans and reports, which include the *2017 Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan* (2018), the 2021 Sacramento County Second 10-Year PM10 Maintenance Plan (2024), the *PM_{10} Implementation/Maintenance Plan and Re-Designation Request* (2010), and *$PM_{2.5}$ Implementation/Maintenance Plan and Re-designation Request for Sacramento $PM_{2.5}$ Nonattainment Area* (2013), present comprehensive strategies to reduce the O_3 precursor pollutants (ROG and NO_x) as well as PM emissions from stationary, area, mobile, and indirect sources. A project is consistent with regional air quality planning efforts in part if it is consistent with the population and housing assumptions that were used in the development of the SMAQMD air quality plans and does nothing to inhibit the region's achievement of air quality standards.

The FPASP EIR/EIS was certified by the City Council on June 14, 2011. The Specific Plan EIR/EIS evaluates air quality impacts, including compliance with federal, state, and regional air quality standards, associated with the development of a range of different land uses at various densities on more than 3,500 acres. The EIR/EIS identifies significance thresholds for all project impacts and includes specific mitigation measures to address both site-specific and cumulative air quality–related effects of development. The development site is located within the FPASP and is thus subject to the air pollutant–reducing mitigation measures contained in the Specific Plan EIR/EIS (see Appendix 4.3-1).

The FPASP has multiple land use designations, specifically: Single Family, Single Family High Density, Multi-Family Low Density, Parks, Open Space, and Right of Way. The FPASP includes the Alder Creek Property development site to serve the future residents within the specific plan area. The Alder Creek Property development would construct the Alder Creek Property Subdivision, which is consistent with the FPASP land use designations for the development site.

The Alder Creek Property development is consistent with the types, intensity, and patterns of land use evaluated by the FPASP EIR/EIS. The Alder Creek Property development is not proposing to amend the City General Plan, FPASP, or Zoning Code, and is consistent with all land use designations applied to the site. Therefore, the Alder Creek Property development would not increase the number of people residing in the area beyond that anticipated. Thus, it would not be contributing to an increase in population or housing growth beyond that currently anticipated and planned for in the FPASP. As such, the Alder Creek Property development would not conflict with the growth projections used by SMAQMD to develop its air quality attainment plans. The Alder Creek Property development would adhere to all applicable planning efforts and documents.

3.3.3.4 Construction and Operations Generated Criteria Air Quality Emissions

Air pollution is largely a cumulative impact. No single project is sufficient in size, by itself, to result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project's individual emissions exceed its identified significance thresholds, the project would be cumulatively considerable. Projects that do not exceed significance thresholds would not be considered cumulative considerable.

Construction-Generated Emission Analysis

Construction-generated emissions are temporary and short-term but have the potential to represent a significant air quality impact. Three basic sources of short-term emissions will be generated through construction of the Alder Creek Property development: operation of the construction vehicles (i.e., excavators, trenchers, dump trucks), the creation of fugitive dust during clearing and grading, and the use of asphalt or other oil-based substances during paving activities. Construction activities such as excavation and grading operations, construction vehicle traffic, and wind blowing over exposed soils would generate exhaust emissions and fugitive PM emissions that affect local air quality at various times during construction. Effects would be variable depending on the weather, soil conditions, the amount of activity taking place, and the nature of dust control efforts. The dry climate of the area during the summer months creates a high potential for dust generation.

The analysis prepared in the FPASP EIR/EIS found that construction activities associated with the development of the FPASP would contribute to air pollutants to a level that is significant and unavoidable despite the imposition of several mitigation measures that reduce the Specific Plan's construction impact. These measures (listed in Appendix 4.3-1) include:

- Specific Plan EIR Mitigation Measure 3A.2-1a: Implement Measures to Control Air Pollutant Emissions Generated by Construction of On-Site Elements.
    - To reduce short-term construction emissions, the project applicant(s) for any particular discretionary development application shall require their contractors to implement SMAQMD's list of Basic Construction Emission Control Practices, Enhanced Fugitive PM Dust Control Practices, and Enhanced Exhaust Control Practices (list below) in effect at the time individual portions of the site undergo construction. In addition to SMAQMD-recommended measures, construction operations shall comply with all applicable SMAQMD rules and regulations.
- Specific Plan EIR Mitigation Measure 3A.2-1b: Pay Off-site Mitigation Fee to SMAQMD to Off-Set NO_x Emissions Generated by Construction of On-Site Elements.
    - Implementation of the Proposed Project or the other four other action alternatives would result in construction-generated NO_X emissions that exceed the SMAQMD threshold of significance, even after implementation of the SMAQMD Enhanced Exhaust Control Practices (listed in Mitigation Measure 3A.2-1a). Additionally, Mitigation Measure 3A.4-1 has the potential to both reduce and increase NO_X emissions, depending on the types of alternative

fuels and engine types employed. Therefore, the project applicant(s) shall pay SMAQMD an off-site mitigation fee for implementation of any of the five action alternatives for the purpose of reducing NO_X emissions to a less-than-significant level (i.e., less than 85 lb/day). All NO_X emission reductions and increases associated with greenhouse GHG mitigation shall be added to or subtracted from the amount above the construction threshold to determine off-site mitigation fees, when possible.

- Specific Plan EIR Mitigation Measure 3A.2-1c: Analyze and Disclose Projected PM10 Emission Concentrations at Nearby Sensitive Receptors Resulting from Construction of On-Site Elements.
    - Prior to construction of each discretionary development entitlement of on-site land uses, the project applicant shall perform a project-level CEQA analysis (e.g., supporting documentation for an exemption, negative declaration, or project-specific EIR) that includes detailed dispersion modeling of construction-generated PM10 to disclose what PM10 concentrations would be at nearby sensitive receptors. The dispersion modeling shall be performed in accordance with applicable SMAQMD guidance that is in place at the time the analysis is performed.
- Specific Plan EIR Mitigation Measure 3A.2-1f: Implement SMAQMD's Enhanced Exhaust Control Practices during Construction of all Off-site Elements. Implement SMAQMD's Enhanced Exhaust Control Practices in order to control NO_x emissions generated by construction of all off-site elements (in Sacramento and El Dorado Counties, or Caltrans right-of-way).

An MMRP was prepared and adopted with the Specific Plan and is a binding document applicable to the Alder Creek Property development. The specific mitigations in the MMRP applicable to the Alder Creek Property development's construction includes EIR/EIS measures 3A.2-1a, 3A.2-1b, 3A.2-1c, and 3A.2-1f. For instance, mitigation measures 3A.2-1a and 3A.2-1f require the implementation of appropriate dust control measures and that SMAQMD emissions standards be met for all heavy-duty construction equipment. Therefore, construction activities would be required to implement the applicable MMRP mitigation measures and the SMAQMD's Basic Construction Emission Control Practices, known as Best Management Practices (BMPs) during construction.

Predicted maximum daily construction-generated emissions for the Alder Creek Property development are summarized in Table 3.3-1.

Table 3.3-1. Construction-Related Emissions

Construction Year	Pollutant					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Daily (pounds per day)						
Construction Calendar Year One	32.10	29.20	63.00	0.07	21.10	11.30
Construction Calendar Year Two	31.90	27.00	60.80	0.07	8.37	2.50

Table 3.3-1. Construction-Related Emissions

Construction Year	Pollutant					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Construction Calendar Year Three	31.50	25.40	58.50	0.07	8.28	2.42
Construction Calendar Year Four	31.30	24.20	56.60	0.07	8.24	2.38
Construction Calendar Year Five	31.20	23.40	54.80	0.07	8.20	2.32
MMRP Mitigation Measure 3A.2-1b Significance Threshold	–	*85 pounds/day*	–	–	–	–
Exceed MMRP Threshold?	–	**No**	–	–	–	–
Annual (tons per year)						
Construction Calendar Year One	2.02	2.99	4.59	0.01	1.03	0.40
Construction Calendar Year Two	4.09	3.46	6.82	0.01	1.08	0.32
Construction Calendar Year Three	4.09	3.28	6.62	0.01	1.08	0.31
Construction Calendar Year Four	4.05	3.11	6.41	0.01	1.07	0.31
Construction Calendar Year Five	1.08	0.81	1.67	0.00	0.29	0.08

Notes: Emission reduction/credits for construction emissions are applied based on the required implementation of SMAQMD Rule 403. The specific Rule 403 measures applied in CalEEMod include sweeping/cleaning adjacent roadway access areas daily, water exposed surfaces twice daily, and limit speeds on unpaved roads to 15 miles per hour. Emissions taken of the season, summer or winter, with the highest outputs. Building construction, paving and painting assumed to occur simultaneously.
CO = Carbon Monoxide; NO_x = Nitrogen Oxide; $PM_{2.5}$ = Fine Particulate Matter; PM_{10} = Coarse Particulate Matter; ROG = Reactive Organic Gas; SMAQMD = Sacramento Metropolitan Air Quality Management District; SO_2 = Sulfur dioxide.

Source: California Energy Emissions Module (CalEEMod) version 2022.1. Refer to Appendix 4.3-2 for Model Data Outputs.

As shown in Table 3.3-1, emissions generated during construction would not exceed the daily threshold for NO_x provided in Mitigation Measure 3.A.2-1b. As the Alder Creek Property development does not surpass the daily NO_x thresholds, Mitigation Measure 3.A.2-1b is not required to be implemented. However, it is acknowledged that the Alder Creek Property development must adhere to all SMAQMD's Best Available Control Technology (BACT)/BMPs in order to be considered less than significant. As previously described, the Alder Creek Property development would be required to adhere to FPASP mitigation measures 3A.2-1a and 3A.2-1f, which require the implementation of appropriate SMAQMD construction emission-reducing control measures. Therefore, construction activities would be required to implement the BMPs during construction. Criteria pollutant emissions generated during construction

would not result in a cumulatively considerable net increase of any criteria pollutant for which the region is nonattainment under an applicable federal or state ambient air quality standard, and no health effects from criteria pollutants would occur.

As demonstrated, the Alder Creek Property development complies with the requirements of the FPASP EIR/EIS. The Alder Creek Property development is consistent with the types, intensity, and patterns of land use evaluated by the FPASP EIR/EIS. Since the Alder Creek Property development is consistent with the land uses analyzed under the FPASP EIR/EIS, construction-related air quality impacts would be the same as analyzed in the EIR/EIS and there would not be an increase in the severity of impacts as a result of the Alder Creek Property development. There would not be a new or substantially more severe significant impact compared with the significance determination contained in the EIR/EIS.

Long-Term Operational Impacts

Implementation of the Alder Creek Property development would result in long-term operational emissions of criteria air pollutants such as PM_{10}, $PM_{2.5}$, CO, and SO_2 as well as O_3 precursors such as ROGs and NO_X. Increases in emissions would be predominantly associated with motor vehicle use. Long-term operational emissions attributable to the Alder Creek Property development are identified in Table 3.3-2. As mentioned previously, implementation of the BMPs provided in the MMRP is necessary in the operations of the Alder Creek Property development. These BMPs include controls for PM and NO_x emissions, compliance with mandatory measures in the California Building Energy Efficiency Standards (Title 24, Part 6) that pertain to efficient use of energy, and compliance with mandatory measures in the California Green Building Code (Title 24, Part 11).

The analysis under the FPASP EIR/EIS found that the long-term increase of criteria air pollutants resulting from implementation of the Folsom Plan Area would be significant and unavoidable. This conclusion was reached despite required adherence to the FPASP MMRP (see Appendix 4.3-1). The MMRP includes measures that reflect SMAQMD guidelines and require the compliance of the SMAQMD-approved FPASP Air Quality Mitigation Plan (AQMP). The AQMP includes measure designed to provide bicycle parking at commercial land uses, an integrated pedestrian/bicycle path network, transit stops with shelters, a prohibition against the use the wood-burning fireplaces, Energy Star roofing materials, electric lawn mowers provided to homeowners at no charge, and on-site transportation alternatives to passenger vehicles (including light rail) that provide connectivity with other local and regional alternative transportation networks. The Alder Creek Property development would be subject to the SMAQMD BACT/BMPs and the applicable mitigation measures under the MMRP, including Mitigation Measure 3A.2-2, which requires project applicants for any particular discretionary development application in the Folsom Plan Area to implement all measures prescribed in the AQMP, including those just described.

Projected daily emissions from operations of the Alder Creek Property development are summarized in Table 3.3-2 accounting for the quantifiable components of the AQMP required by EIR/EIS mitigation measure 3A.2-2. Because many required air pollutant–reducing components of the AQMP cannot be quantified due to limitations in the modeling software, projected daily emissions would most likely be less than identified in Table 3.3-2.

Table 3.3-2. Operational-Related Emissions						
Emission Source	**Pollutant (pounds per day)**					
	ROG	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Summer Emissions						
Mobile	59.40	54.50	579.00	1.35	120.00	13.00
Area	12.50	0.15	17.50	0.00	0.03	0.02
Energy	0.13	2.43	2.04	0.01	0.18	0.18
Total:	**39.63**	**27.48**	**274.54**	**0.59**	**50.41**	**13.20**
Winter Emissions						
Mobile	24.30	29.20	213.00	0.53	50.20	13.00
Area	9.63	0.00	0.00	0.00	0.00	0.00
Energy	0.13	2.43	2.04	0.01	0.18	0.18
Total:	**34.06**	**31.63**	**215.04**	**0.54**	**50.38**	**13.18**

Notes: Emission projections predominately based on CalEEMod model defaults for Sacramento County. CalEEMod = California Emissions Estimator Model; CO = Carbon Monoxide; NO_x = Nitrogen Oxide; $PM_{2.5}$ = Fine Particulate Matter; PM_{10} = Coarse Particulate Matter; ROG = Reactive Organic Gas; SO_2 = Sulfur dioxide

Source: CalEEMod version 2022.1. Refer to Appendix 4.3-2 for Model Data Outputs.

As previously described, the analysis under the FPASP EIR/EIS found that the long-term increase of criteria air pollutants resulting from implementation of the Folsom Plan Area would be a significant and unavoidable impact. The applicable air quality mitigations in the MMRP are intended to reduce the impacts of the Alder Creek Property development's emissions. The Alder Creek Property development complies with the requirements of the EIR/EIS, including adherence to the MMRP that contains mitigation measure 3A.2-2, which requires the Alder Creek Property development to implement all measures prescribed in the AQMP. The Alder Creek Property development is consistent with the types, intensity, and patterns of land use evaluated by the FPASP EIR/EIS. Since the Alder Creek Property development is consistent with the land uses analyzed under the FPASP EIR/EIS, operational-related air quality impacts would be the same as analyzed in the EIR/EIS and there would not be an increase in the severity of impacts as a result of the Alder Creek Property development. There would not be a new or substantially more severe significant impact compared with the significance determination contained in the EIR/EIS.

Exposure of Sensitive Receptors to Substantial Pollution Concentrations

Sensitive receptors are defined as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers. CARB has identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over age 65, children under age 14, athletes, and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis. The nearest sensitive receptors are several single-family homes across Mangini Parkway from the southern boundary of the development site.

Construction-Generated Air Contaminants

Construction-related activities would result in temporary, short-term development-generated emissions of diesel particulate matter (DPM), ROG, NOx, CO, and PM_{10} from the exhaust of off-road, heavy-duty diesel equipment for site preparation (e.g., clearing, grading); soil hauling truck traffic; paving; and other miscellaneous activities. The portion of the SVAB which encompasses the development area is designated as a nonattainment area for federal O_3 and $PM_{2.5}$ standards and is also a nonattainment area for the state standards for O_3 and PM_{10} standards (CARB 2023). Thus, existing O_3, PM_{10}, and $PM_{2.5}$ levels in the SVAB are at unhealthy levels during certain periods. However, as shown in Table 3.3-1, the Alder Creek Property development would not exceed the SMAQMD significance thresholds for emissions during construction.

The health effects associated with O_3 are generally associated with reduced lung function. O_3 is not emitted directly into the air but is formed through complex chemical reactions between precursor emissions of ROG and NO_x in the presence of sunlight. The reactivity of O_3 causes health problems because it damages lung tissue, reduces lung function and sensitizes the lungs to other irritants. Scientific evidence indicates that ambient levels of O_3 not only affect people with impaired respiratory systems, such as asthmatics, but healthy adults and children as well. Exposure to O_3 for several hours at relatively low concentrations has been found to significantly reduce lung function and induce respiratory inflammation in normal, healthy people during exercise. This decrease in lung function generally is accompanied by symptoms including chest pain, coughing, sneezing and pulmonary congestion.

Studies show associations between short-term O_3 exposure and non-accidental mortality, including deaths from respiratory issues. Studies also suggest long-term exposure to O_3 may increase the risk of respiratory-related deaths. The concentration of O_3 at which health effects are observed depends on an individual's sensitivity, level of exertion (i.e., breathing rate), and duration of exposure. Studies show large individual differences in the intensity of symptomatic responses, with one study finding no symptoms to the least responsive individual after a 2-hour exposure to 400 parts per billion of O_3 and a 50 percent decrement in forced airway volume in the most responsive individual. Although the results vary, evidence suggests that sensitive populations (e.g., asthmatics) may be affected on days when the 8-hour maximum O_3 concentration reaches 80 parts per billion. Because the development would not involve construction activities that would result in O_3 precursor emissions (ROG or NOx) in excess of the SMAQMD thresholds, which are set to be protective of human health and account for cumulative emissions in the SVAB, the Alder Creek Property development is not anticipated to substantially contribute to regional O_3 concentrations and the associated health impacts.

CO tends to be a localized impact associated with congested intersections. In terms of adverse health effects, CO competes with oxygen, often replacing it in the blood, reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can include dizziness, fatigue, and impairment of central nervous system functions. The development would not involve construction activities that would result in CO emissions more than any common significance thresholds. Thus, the Alder Creek Property development's CO emissions would not contribute to the health effects associated with this pollutant.

Particulate matter (PM_{10} and $PM_{2.5}$) contains microscopic solids or liquid droplets that are so small that they can get deep into the lungs and cause serious health problems. Particulate matter exposure has been

linked to a variety of problems, including premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms such as irritation of the airways, coughing, or difficulty breathing. For construction activity, DPM is the primary toxic air contaminant of concern. PM_{10} exhaust is considered a surrogate for DPM as all diesel exhaust is considered to be DPM and it contains $PM_{2.5}$ exhaust as a subset. As with O_3 and NO_x, the development would not generate emissions of PM_{10} that would exceed the SMAQMD's thresholds. The increases of these pollutants generated by the Alder Creek Property development would not on their own generate an increase in the number of days exceeding the NAAQS or CAAQS standards. Therefore, PM_{10} and $PM_{2.5}$ emissions, when combined with the existing PM emitted regionally, would have minimal health effect on people located in the immediate vicinity of the development site. Additionally, the Alder Creek Property development's PM_{10} and $PM_{2.5}$ emissions are not expected to cause any increase in related regional health effects from these pollutants.

In summary, construction would not result in a potentially significant contribution to regional concentrations of nonattainment pollutants and would not result in a significant contribution to the adverse health impacts associated with those pollutants.

Consistent with FPASP EIR/EIS requirements, particulate matter concentration and dispersion was modeled for the construction of the development using the EPA's AERMOD air toxic dispersion model (see Appendix 4.3-3). AERMOD is a steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain.

As stated in the FPASP EIR/EIS, particulate matter is a pollutant of greatest concern with respect to construction activities. The Alder Creek Property development is surrounded by a developing community of planned and existing single-family residential homes. The nearest sensitive receptors would be several approved and planned single-family homes across Mangini Parkway on the southern boundary of the development site. These parcels are currently undeveloped, however the FPASP EIR/EIS identifies that these parcels will be developed into single family homes. As such, FPASP EIR/EIS mitigation measure 3A.2-1c requires that Specific Plan project applicants prepare detailed dispersion modeling of construction-generated PM_{10} to disclose the PM_{10} concentrations at nearby sensitive receptors. In order to fulfill the requirements of this measure, PM_{10} concentrations associated with the construction of the Alder Creek Property development were modeled in accordance with applicable SMAQMD guidance (see Appendix 4.3-3). Appendix 4.3-3 presents the calculated PM_{10} concentrations in the vicinity of the development site. The AERMOD program generated an estimate of 24-hour average concentrations using a 1-year data file of hourly weather observations recorded at Sacramento International Airport. The SMAQMD does not currently promulgate a particulate matter concentration threshold. The maximum 24-hour concentration would reach 422.96 $\mu g/m^3$.

Construction of the Alder Creek Property development complies with the requirements of the FPASP EIR/EIS and would not result in an increase in the severity of air toxic–related air quality impacts compared with the FPASP EIR/EIS.

Consistent with FPASP EIR/EIS Cumulative Mitigation Measure AIR-1, a project-level screening analysis was conducted to evaluate whether proposed residential uses on the Project Site would be exposed to substantial health risks from TACs, including DPM, emitted by vehicles traveling on Prairie City Road. Prairie City Road traverses adjacent to the Proposed Project Site and is expected to accommodate future FPASP-related traffic as well as haul truck traffic associated with regional quarry operations.

Consistent with FPASP EIR/EIS Cumulative Mitigation Measure AIR-1, this screening analysis applies the SMAQMD *Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways* (2011). Under this protocol, a project warrants a full health risk assessment (HRA) only if it is located (1) within 500 feet of a high-traffic roadway, defined as a freeway, an urban roadway carrying more than 100,000 vehicles per day, or a rural roadway carrying more than 50,000 vehicles per day. Existing traffic volumes on Prairie City Road are approximately 3,309 average daily trips (City of Folsom 2017 Traffic Count Map). To account for future cumulative conditions, buildout traffic volumes from the FPASP EIR/EIS and related quarry EIRs were reviewed. The FPASP EIR/EIS identifies approximately 40,600 average daily trips (ADT), while the Teichert Quarry EIR (2010) and Stoneridge Quarry EIR (2011) estimate 47,198 ADT and 37,000 ADT, respectively, for this same segment under cumulative conditions.

Even under the most conservative estimate, future cumulative volumes would remain well below 50,000 ADT, meaning Prairie City Road does not meet SMAQMD's definition of a high-traffic roadway. Because the Project is not located adjacent to a roadway that exceeds SMAQMD's high-traffic volume thresholds, the Project does not trigger the need for a detailed HRA under the SMAQMD protocol. Accordingly, development of the Alder Creek Property would not expose future sensitive receptors to substantial TAC emissions from quarry truck traffic or other vehicles traveling on Prairie City Road, and the Project is consistent with FPASP EIR/EIS Cumulative Mitigation Measure AIR-1.

Operational Air Contaminants

The health risk public-notification thresholds adopted by the SMAQMD is 10 excess cancer cases in a million for cancer risk and a hazard index of more than one (1.0) for non-cancer risk. Examples of projects that emit toxic pollutants over long-term operations include oil and gas processing, gasoline dispensing, dry cleaning, electronic and parts manufacturing, medical equipment sterilization, freeways, and rail yards. Implementation of the Alder Creek Property development would not result in the development of any substantial sources of air toxics. There are no stationary sources associated with the operations of the development; nor would the development attract additional heavy-duty vehicles that spend long periods queuing and idling at the site. Onsite emissions would not result in significant concentrations of pollutants at nearby sensitive receptors. The Alder Creek Property development would not have a high carcinogenic or non-carcinogenic risk during operation.

Carbon Monoxide Hot Spots

It has long been recognized that CO exceedances are caused by vehicular emissions, primarily when idling at intersections. Concentrations of CO are a direct function of the number of vehicles, length of delay, and traffic flow conditions. Under certain meteorological conditions, CO concentrations close to congested intersections that experience high levels of traffic and elevated background concentrations may reach

unhealthy levels, affecting nearby sensitive receptors. Given the high traffic volume potential, areas of high CO concentrations, or "hot spots," are typically associated with intersections that are projected to operate at unacceptable levels of service during the peak commute hours. It has long been recognized that CO hotspots are caused by vehicular emissions, primarily when idling at congested intersections. However, transport of this criteria pollutant is extremely limited, and CO disperses rapidly with distance from the source under normal meteorological conditions. Furthermore, vehicle emissions standards have become increasingly more stringent in the last 20 years. Currently, the allowable CO emissions standard in California is a maximum of 3.4 grams/mile for passenger cars (there are requirements for certain vehicles that are more stringent). With the turnover of older vehicles, introduction of cleaner fuels, and implementation of increasingly sophisticated and efficient emissions control technologies, CO concentration in the SVAB is designated as in attainment. Detailed modeling of development-specific CO "hot spots" is not necessary and thus this potential impact is addressed qualitatively.

A CO "hot spot" would occur if an exceedance of the state one-hour standard of 20 parts per million (ppm) or the eight-hour standard of 9 ppm were to occur. The analysis prepared for CO attainment in the South Coast Air Quality Management District's (SCAQMD's) 1992 Federal Attainment Plan for Carbon Monoxide in Los Angeles County and a Modeling and Attainment Demonstration prepared by the SCAQMD as part of the 2003 AQMP can be used to demonstrate the potential for CO exceedances of these standards. The SCAQMD is the air pollution control officer for much of southern California. The SCAQMD conducted a CO hot spot analysis as part of the 1992 CO Federal Attainment Plan at four busy intersections in Los Angeles County during the peak morning and afternoon time periods. The intersections evaluated included Long Beach Boulevard and Imperial Highway (Lynwood), Wilshire Boulevard and Veteran Avenue (Westwood), Sunset Boulevard and Highland Avenue (Hollywood), and La Cienega Boulevard and Century Boulevard (Inglewood). The busiest intersection evaluated was at Wilshire Boulevard and Veteran Avenue, which has a traffic volume of approximately 100,000 vehicles per day. Despite this level of traffic, the CO analysis concluded that there was no violation of CO standards (SCAQMD 2024). In order to establish a more accurate record of baseline CO concentrations affecting the Los Angeles, a CO "hot spot" analysis was conducted in 2003 at the same four busy intersections in Los Angeles at the peak morning and afternoon time periods. This "hot spot" analysis did not predict any violation of CO standards. The highest one-hour concentration was measured at 4.6 ppm at Wilshire Boulevard and Veteran Avenue and the highest eight-hour concentration was measured at 8.4 ppm at Long Beach Boulevard and Imperial Highway. Thus, there was no violation of CO standards.

Similar considerations are also employed by other Air Districts when evaluating potential CO concentration impacts. More specifically, the Bay Area Air Quality Management District, the air pollution control officer for the San Francisco Bay Area, concludes that under existing and future vehicle emission rates, a given project would have to increase traffic volumes at a single intersection by more than 44,000 vehicles per hour or 24,000 vehicles per hour where vertical and/or horizontal air does not mix—in order to generate a significant CO impact.

According to CalEEMod default inputs, which are based on the Institute of Traffic Engineers (ITE) Trip Generation Manual, the single-family homes would generate an average of 13,068 trips per weekday, and the fire station would generate 561 trips per day. Combining the two of these, the average daily trips for

the Alder Creek Property development would be 13,628 daily trips. Thus, the Alder Creek Property development would not generate traffic volumes at any intersection of more than 100,000 vehicles per day (or 44,000 vehicles per hour) and there is no likelihood of it traffic exceeding CO values.

Odors that Could Potentially Affect Sensitive Receptors

Typically, odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another. It is also important to note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

During construction, the Alder Creek Property development presents the potential for generation of objectionable odors in the form of diesel exhaust in the immediate vicinity of the site. However, these emissions are short-term in nature and will rapidly dissipate and be diluted by the atmosphere downwind of the emission sources. Additionally, odors would be localized and generally confined to the construction area. Therefore, construction odors would not adversely expose a substantial number of people to odor emissions.

According to the SMAQMD, land uses commonly considered to be potential sources of obnoxious odorous emissions include wastewater treatment plants, sanitary landfills, composting/green waste facilities, recycling facilities, petroleum refineries, chemical manufacturing plants, painting/coating operations, rendering plants, and food packaging plants. The Alder Creek Property development does not include any uses identified by the SMAQMD as being associated with odors.

3.3.4 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.
7. The FPASP EIR/EIS included 20 mitigation measures (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to air quality/greenhouse gas emissions that the proposed Project would have to adhere to.

3.4 Biological Resources

3.4.1 Environmental Setting

ECORP Consulting, Inc. is preparing the Biological Resources Assessment for the Proposed Toll Brothers Alder Creek Project Within the FPASP (ECORP 2025e) and is summarized hereto.

The Project Area is located within relatively flat to gently rolling terrain. The Project Area is situated at an elevational range of approximately 260 to 400 feet above mean sea level in the Sacramento Valley Subregion of the Great Central Valley floristic region of California. The average winter low temperature in the vicinity of the BSA is 39.8 degrees Fahrenheit (˚F) and the average summer high temperature is 92.7˚F. Average annual precipitation is approximately 24.48 inches, which falls as rain.

The following vegetation communities and land cover types within the Project Area as observed during the field surveys:

- Annual Grassland
- Blue Oak Woodland
- Valley Needlegrass Grassland
- Fremont Cottonwood Woodland
- Arroyo Willow Thicket
- Goodding's Willow Woodland
- Disturbed/Developed

A total of 8.944-acres of aquatic resources were mapped within the Project Area. The aquatic features identified onsite include vernal pool, seasonal wetland, seasonal wetland swale, creek, intermittent drainage, seep, pond and ditch.

Seasonal wetland swales and ephemeral and intermittent drainages connect vernal pools and seasonal wetlands throughout the site. The majority of these features drain to Alder Creek to the north and east of the site. Predominant vegetation within the aquatic features include toad rush (*Juncus bufonius*), Mediterranean barley (*Hordeum marinum ssp. gussoneanum*), annual rabbit-foot grass (*Polypogon monspeliensis*), hyssop loosestrife (*Lythrum hyssopifolia*), and pennyroyal (*Mentha pulegium*)., annual hairgrass (*Deschampsia danthonioides*), and Carter's buttercup (*Ranunculus bonariensis*)Two farm ponds are located along the eastern portion of the BSA with emergent vegetation along the margins and Fremont's cottonwood (*Populus fremontii)* and willow (*Salix* sp.) in the overstory.

3.4.2 FPASP EIR/EIS Summary

According to the FPASP EIR/EIS, although impacts on some biological resources were reduced to less than significant levels through implementation of mitigation measures, impacts on jurisdictional waters of the United States, including wetlands, and blue oak woodlands would remain significant and unavoidable even with implementation of the mitigation measures because the project would contribute substantially to the regional loss of these habitats and temporal losses of aquatic resources and blue oak woodland would occur during implementation of mitigation. Until performance standards and success criteria are met and the FPASP EIR/EIS found it was unknown whether the acreage and functions of these habitats can be replaced through preservation and creation since a mitigation plan had not been developed. The FPASP EIR/EIS found that even after a mitigation plan would be developed and implemented, there would be a substantial regional loss of this resource for many decades and the full range of habitat functions may never be successfully replaced. Impacts on trees protected under Folsom Municipal Code and County Tree Preservation Ordinance were found to be significant and unavoidable because temporal losses of oak tree resources would persist until replacement trees reached comparable sizes to the trees to be removed; a process that would take many decades, and it was unknown if suitable mitigation sites would be available in the region to establish replacement trees at appropriate ratios to compensate for the loss of

oak tree resources in the SPA. Cumulative impacts on aquatic resources, oak woodlands, nesting and foraging habitat for raptors, including Swainson's hawk, and potential habitat for special-status plant species remained significant and unavoidable even with implementation of mitigation measures because the project would contribute substantially to the regional loss and degradation of these habitats.

3.4.3 Biological Resources Conformity Analysis

3.4.3.1 Special Status Species

Impacts to biological resources were identified as a significant and unavoidable impact in the FPASP EIR/EIS. Mitigation Measures within FPASP EIR/EIS require protocol-level pre-construction special-status plant surveys and special-status wildlife species be conducted prior to breaking ground for new Projects within the FPASP. If special-status species are found during the focused surveys, consultation will occur with CDFW and/or USFWS, as appropriate depending upon species status, to determine the appropriate mitigation measures for direct and indirect impacts on any special-status species population that could occur as a result of Project implementation. Therefore, the analysis under the FPASP EIR/EIS remains accurate with respect to the proposed Project. Additionally, the Project would be required to adhere to all mitigation measures listed in the FPASP EIR/EIS.

Subsequent to the issuance of the FPASP EIR/EIS, Crotch bumble bee was added as a candidate for listing as endangered under the California Endangered Species Act. The Project has potential foraging, nesting, and overwintering habitat for Crotch bumble bee. A habitat assessment and focused survey for Crotch's bumble bee may be required by CDFW prior to the commencement of construction activities. If Crotch's bumble bee nests are found within the Proposed Project impacts, additional mitigation and avoidance measures shall be developed in consultation with CDFW. This potential impact would be less than significant with the requirement of preconstruction surveys.

3.4.3.2 Aquatic Resources

A total of 8.944-acres of aquatic resources were mapped within the Project Area. The FPASP EIR/EIS required mitigation that all Project would be required to secure CWA Section 404, Section 401, and/or Porter-Cologne Water Quality Control Act permits and implement corresponding mitigation measures prior to Project implementation.

A CWA 404 permit (SPK-2007-02159) and CWA 401 certification (Waste Discharge Identification #5A34CR00519) was previously issued for the aquatic resources within the Backbone Infrastructure Project Area. The majority of the Project Area falls under the CWA 404 permit (SPK-2006-00561) and CWA 401 Certification (Waste Discharge Identification #5A34CR00681) for the Alder Ranch Project. Prior to Project implementation, the Project shall acquire permit authorizations for the remainder of the BSA located in the Javanifard and Zarghami property.

A Master Streambed Alteration Agreement (MSAA) for the FPASP was issued by CDFW on February 11, 2014 (1600-2012-0198-R2). The MSAA outlines several required conditions for all projects located within the FPASP. Per Section 6 of the MSAA, the Project shall meet the requirements of and submit a Sub-Notification Form prior to CDFW prior to Project implementation.

Therefore, the analysis under the FPASP EIR/EIS remains accurate with respect to the proposed Project.

3.4.3.3 Movement Corridors

There are no designated or potential wildlife movement corridors, California Essential Habitat Connectivity areas, or potential nursery sites are known to occur in the Project Area or would be adversely affected by Project activities. Therefore, the analysis under the FPASP EIR/EIS remains accurate with respect to the proposed Project.

3.4.3.4 Local Plans and Ordinances

The proposed Project may impact individual oak trees and oak woodlands within the Project Area. The FPASP EIR/EIS requires mitigation for impacts to oak trees and oak woodland prior to tree removal. An Oak Woodland Impact and Mitigation Plan shall be developed and approved by the City of Folsom prior to Project implementation, and appliable tree removal and tree work permits will be obtained from the City of Folsom and Sacramento County. Oak trees outside of the development footprint will be protected during construction in accordance with the applicable requirements and permits. Therefore, the analysis under the FPASP EIR/EIS remains accurate with respect to the proposed Project.

The Project has been designed to be consistent with the Folsom Plan Area Open Space Plan. Prior to initiation of construction, Conservation Areas will be protected by a declaration of covenants and restrictions or conservation easement. Conservation Areas and Passive Recreation Open Space Areas will be protected and managed in accordance with the Open Space Plan during construction and then transferred by deed to the City of Folsom for permanent protection.

3.4.4 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.

7. The FPASP EIR/EIS included 18 mitigation measures (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to biological resources that the proposed Project would have to adhere to.

3.5 Cultural Resources

3.5.1 Environmental Setting

The following summary is extracted from the Historic Property Management Plan for the Folsom Plan Area (City of Folsom 2011), within which primary sources are cited. It is intended to provide context that is scaled to the Project but is not a comprehensive historical overview.

It is generally believed that human occupation of California began at least 10,000 years Before Present (BP). The archaeological record indicates that between approximately 10,000 and 8,000 BP, a predominantly hunting economy existed, characterized by archaeological sites containing numerous projectile points and butchered large animal bones. Around 8,000 BP, there was a shift in focus from hunting toward a greater reliance on plant resources. Archaeological evidence of this trend consists of a much greater number of milling tools (e.g., metates and manos) for processing seeds and other vegetable matter. This period, which extended until around 5,000 BP, is sometimes referred to as the Millingstone Horizon. Projectile points are found in archaeological sites from this period, but they are far fewer in number than from sites dating to 8,000 BP. An increase in the size of groups and the stability of settlements is indicated by deep, extensive middens at some sites from this period.

Archaeological evidence indicates that reliance on both plant gathering and hunting continued as in the previous period, with more specialized adaptation to particular environments in sites dating to after about 5,000 BP. Mortars and pestles were added to metates and manos for grinding seeds and other vegetable material. Flaked-stone tools became more refined and specialized, and bone tools were more common. New peoples from the Great Basin began entering Southern California during this period. These immigrants, who spoke a language of the Uto-Aztecan linguistic stock, seem to have displaced or absorbed the earlier population of Hokan-speaking peoples. Regional subcultures also started to develop, each with its own geographical territory and language or dialect. The presence of small projectile points indicates the introduction of the bow and arrow into the region sometime around 2,000 BP.

Archaeological work during the 1920s and 1930s led to the cultural chronology for Central California that was based on the results of excavations conducted in the lower Sacramento River Valley. The Paleoindian Period began when the first people began to inhabit what is now known as the California culture area. It was commonly believed these first people (i.e., hunters and gatherers) subsisted on big game and minimally processed foods, presumably with no trade networks. Populations likely consisted of small groups traveling frequently to exploit plant and animal resources. The Archaic period was characterized by an increase in plant exploitation for subsistence, more elaborate burial accoutrements, and increase in trade network complexity.

Prior to the arrival of European-Americans in the region, Indigenous groups speaking more than 100 different languages and occupying a variety of ecological settings inhabited California. Ethnographically, the Project Area is in the southwestern portion of the territory occupied by the Penutian-speaking Nisenan. Nisenan inhabited the drainages of the Yuba, Bear, and American rivers. As a language group, Nisenan (meaning *from among us* or *of our side*) are members of the Maiduan Family of the Penutian stock and are generally divided into three groups based on dialect differences: the Northern Hill

(mountain) Nisenan in the Yuba River drainage; the Valley Nisenan along the Sacramento River; and the Southern Hill (foothills) Nisenan along the American River.

Nisenan practiced seasonal migration, a subsistence strategy involving moving from one area or elevation to another to harvest plants, fish, and hunt game across contrasting ecosystems that were in relatively close proximity. Valley Nisenan generally did not range beyond the valley and lower foothills, while foothill and mountain groups ranged across a more extensive area that included jointly shared territory whose entry was subject to traditional understandings of priority of ownership and current relations between the groups. Communally organized Nisenan task groups exploited a wide variety of resources. Communal hunting drives were undertaken to obtain deer, quail, rabbits, and grasshoppers. Acorns were gathered in the fall and stored in granaries for use during the rest of the year.

The Spanish arrived on the Central California coast in 1769. Early contact with the first Spanish explorers to enter California was limited to the peripheries of Nisenan territory; they occurred mainly to the south on lands of the Miwok which had been explored by José Canizares in 1776, with only ephemeral explorations into Nisenan lands. There are no records of Nisenan groups being removed to the missions. However, they received escapees from the missions, as well as pressure of displaced Miwok populations on their southern borders. A deadly epidemic (probably malaria) swept through the Sacramento Valley in 1833 and it had a devastating effect on Nisenan populations. Entire villages were lost and surviving Nisenan retreated into the hills. An estimated 75 percent of their population was wiped out, and only a handful were left to face the gold miners and settlers who were soon to follow.

After Mexico became independent from Spain in 1821, what is now California became the Mexican province of Alta California with its capital at Monterey. In 1827, American trapper Jedediah Smith traveled along the Sacramento River and into the San Joaquin Valley. The Mexican government closed the missions in the 1830s and former mission lands, as well as previously unoccupied areas, were granted to retired soldiers and other Mexican citizens for use as cattle ranches. Much of the land along the coast and in the interior valleys became part of Mexican land grants or ranchos.

John Sutter, a European immigrant, built a fort at the confluence of the Sacramento and American rivers in 1839 and petitioned the Mexican governor of Alta California for a land grant, which he received in 1841. Gold was discovered in the flume of Sutter's lumber mill at Coloma on the South Fork of the American River in January 1848. The discovery of gold initiated the 1849 California Gold Rush, which brought thousands of miners and settlers to the Sierra foothills east and southeast of Sacramento.

Mining is the dominant historical theme in the Project Area and in the surrounding lands. The region later known as the Folsom Mining District was extensively placer mined during the Gold Rush. The Folsom area was originally settled in 1849 by African-American miners, and from that circumstance the area became known as Negro Bar. By 1855, Chinese miners were reworking abandoned diggings and a large number of them were employed at various regional mines through the 1880s.

Initially, during the early 1850s, surface deposits (usually less than 3 feet deep) were placer mined through a series of small hand-dug excavations. The surface gravel was washed by pan or by higher-volume methods that employed rockers, long toms, and/or sluice boxes. These activities were often initially concentrated along drainages and swales such as Morrison Creek, which drains the Project Area. Ground

sluicing, a technique that uses water (not under pressure) to break down gold-bearing gravels, could have occurred any time from the 1850s up until the turn of the century. Low-pressure hydraulic mining took place at Rebel Hill sometime between the mid-1850s and 1884.

From the early 1850s until the late 1890s and again in 1925, drift mining was employed at Alder Creek. As cemented gravels cap some of the area, shafts were sunk through this hard surface layer into the "softer" gravels. Gold-bearing leads were followed out with drift-mining techniques in these softer gravels. A more detailed historic context statement is provided in the Historic Property Management Plan .

3.5.2 Summary of Cultural Resources

ECORP Consulting, Inc. prepared the Cultural Resources Due Diligence for the Proposed Toll Brothers Alder Creek Project Within the FPASP (ECORP 2024) and is summarized hereto. Through various studies and consultations, the entire Carpenter Ranch, Hillsborough (Alder Ranch), Mangini Ranch, and J&Z, and Backbone Infrastructure permit areas (including the proposed Alder Creek Project) have been fully inventoried for Historical Resources and Historic Properties. In some cases, pre-construction compliance verifications have been received.

ECORP documented 55 sites as a result of these efforts that are located within the Property (Table 3.5-1). Many of these resources are elements of the historic Rhoades' Diggings Mining District (RDMD) (P-34-4667).

Table 3.5-1. Cultural Resources within the Subject Property

Site #	Description	Significance
P-34-1067	Ditch	Not eligible for the NRHP or CRHR
P-34-1694	Dam	Not eligible for the NRHP or CRHR
P-34-1696	Windmill and Well Site	Not eligible for the NRHP or CRHR
P-34-1742	Rhoades' Branch Ditch	Individually eligible NRHP/CRHR A/1 and D/4 / Contributing Element to RDMD
P-34-1743	Shallow Quartz Prospecting Site	Contributing Element to RDMD
P-34-1752	Prospect Pits (Filled with Modern Refuse) and Wooden Post	Not eligible for the NRHP or CRHR
P-34-1753	Ditch	Contributing Element to RDMD
P-34-1754	Prospect Pit	Not eligible for the NRHP or CRHR
P-34-1756	Ditch	Contributing Element to RDMD
P-34-1757	Prospect Pit	Not eligible for the NRHP or CRHR
P-34-1791	Ravine Diggings, Ground Sluicing, Mine Adit, Hydraulic Mining	Contributing Element to RDMD
P-34-1793	Ravine Diggings, Placer Mining Landscape	Contributing Element to RDMD
P-34-1794	Ditch	Contributing Element to RDMD

Table 3.5-1. Cultural Resources within the Subject Property		
Site #	**Description**	**Significance**
P-34-1821	Cabin or Campsite	Individually Eligible NRHP/CRHR D/4 / Contributing Element to RDMD
P-34-1907	Ravine Diggings	Contributing Element to RDMD
P-34-1918	Ditch	Contributing Element to RDMD
P-34-1919	Ravine Diggings, Rock Dams, Ditch Segments, Filled-In Mine Shaft, Pits	Contributing Element to RDMD
P-34-1922	Ditch	Contributing Element to RDMD
P-34-2084	Placer Mining Landscape	Contributing Element to RDMD
P-34-2085	Residential Site	Individually Eligible NRHP/CRHR D/4 / Contributing Element to RDMD
P-34-2195	Transmission Line	Not eligible for the NRHP or CRHR
P-34-2227	Stone Foundation	Contributing Element to RDMD - Pending
P-34-2228	Modern Debris	Not a resource
P-34-2229	Stone Foundation	Contributing Element to RDMD - Pending
P-34-2230	Dam and Reservoir	Not eligible for the NRHP or CRHR - Pending
P-34-2231	Prospect Pit	Contributing Element to RDMD - Pending
P-34-4676	Ravine Diggings	Contributing Element to RDMD
P-34-4677	Placer Mining Landscape (Shallow Diggings)	Contributing Element to RDMD
P-34-4704	Prospect Pits (Quartz)	Contributing Element to RDMD
P-34-4705	Pocket Mining Landscape	Contributing Element to RDMD
P-34-4707	Ravine Diggings	Contributing Element to RDMD
P-34-4709	Shallow Quartz Prospecting Site	Contributing Element to RDMD
P-34-4711	Isolate	Not eligible for the NRHP or CRHR
P-34-4712	Rock Fence	Not eligible for the NRHP or CRHR
P-34-4713	Prospect Pit	Not eligible for the NRHP or CRHR
P-34-4714	Residential Site	Individually Eligible NRHP/CRHR D/4 / Contributing Element to RDMD
P-34-4715	Prospect Pits	Not eligible for the NRHP or CRHR
P-34-4718	Prospect Pit (Hilltop)	Not eligible for the NRHP or CRHR
P-34-4719	Prospect Pits/Trenches	Contributing Element to RDMD
P-34-4720	Prospect Pit (Hilltop)	Not eligible for the NRHP or CRHR
P-34-4721	Prospect Pit (Hilltop)	Not eligible for the NRHP or CRHR
P-34-4751	Placer Mining Landscape, Ravine Diggings	Contributing Element to RDMD
P-34-4760	Ditch	Contributing Element to RDMD

Table 3.5-1. Cultural Resources within the Subject Property		
Site #	**Description**	**Significance**
P-34-4761	Berm	Not eligible for the NRHP or CRHR
P-34-4762	Trench and Prospecting Pits	Not eligible for the NRHP or CRHR
P-34-4763	Berm	Not eligible for the NRHP or CRHR
P-34-4764	Ditch	Not eligible for the NRHP or CRHR
P-34-4768	Prospect Pits and Berm	Contributing Element to RDMD
P-34-4977	Ravine Diggings	Contributing Element to RDMD - Pending
P-34-4978	Ditch	Contributing Element to RDMD - Pending
P-34-4979	Ravine Diggings	Contributing Element to RDMD - Pending
P-34-4980	Isolated Arrastra Fragment	Not eligible for the NRHP or CRHR - Pending
P-34-4981	Isolated Bottle-Glass	Not eligible for the NRHP or CRHR - Pending
P-34-4982	Ravine Diggings	Contributing Element to RDMD - Pending
P-34-4983	Prospect Pit	Contributing Element to RDMD - Pending

Note: CRHR = California Register of Historic Resources; NRHP = National Register of Historic Places; RDMD = Rhoades' Diggings Mining District

3.5.3 FPASP EIR/EIS Summary

According to the FPASP EIR/EIS, with implementation of required mitigation measures, potential impacts to previously unknown human remains would be less than significant. Additionally, with mitigation incorporated, impacts to historical resources would be less than significant. It was detailed that when resources cannot be avoided, appropriate documentation or data recovery excavation must be performed and locations of known cultural resources must be monitored for the potential discovery of cultural resources. However, it was found that beyond the inventory, evaluation, treatment, and monitoring required as stated in the required mitigation measures, there was no other feasible mitigations measures that may be performed to minimize potentially significant impacts on cultural resources. Therefore, impacts on identified and previously undiscovered cultural resources were found to be potentially significant and unavoidable.

3.5.4 Cultural Resources Conformity Analysis

Project implementation would have no substantial change to cultural environmental checklist items described in the FPASP EIR/EIS. Impacts to identified and previously undiscovered cultural resources were identified as a significant and unavoidable impact in the FPASP EIR/EIS and the Project does not introduce any new or unique features that were not analyzed in the FPASP EIR/EIS or 2016 Addendum. No new circumstances or Project changes have occurred. Therefore, the Proposed Project would have no new impact on cultural resources, historic resources, or human remains.

3.5.5 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.
7. The FPASP EIR/EIS included four mitigation measures (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to cultural resources that the proposed Project would have to adhere to.

3.6 Energy

Energy was formally added as a distinct topic in the CEQA Environmental Checklist (Appendix G) in 2019. The EIR/EIS for the FPASP was certified prior to July 1, 2019. As such, the analysis of Energy impacts does not retroactively apply to the certified EIR.

3.7 Geology and Soils

3.7.1 Environmental Setting

3.7.1.1 Geomorphic Setting

The site is located in the westernmost extent of the Sierra Nevada Foothills, between the Central Sierra Nevada and the Central Valley Geomorphic Provinces. The Sierra Nevada is dominated by younger plutonic rocks within older metamorphic wall rock that was emplaced during active plate subduction along the paleo-continental margin. The Central Valley Geomorphic Province is an alluvial plain with sediment derived from the eastern and western flanking mountain ranges. The valley drains via the Sacramento and San Joaquin Rivers into the San Francisco Bay area. The site is underlain by Jurassic-age Gopher Ridge Volcanics and Salt Springs Slate. The Gopher Ridge Volcanics consist primarily of mafic pyroclastic rock and Salt Springs Slate consisting of dark grey slate with some mica schist. The geologic

units found at the Project site are striking approximately northwest-southeast, similar to most metamorphic rock of the Sierra Nevada Foothills.

3.7.1.2 Regional Seismicity and Fault Zones

The California Department of Conservation, Division of Mines and Geology, defines an *active fault* as one that has been subjected to surface displacement within the last 11,000 years. A fault is considered *inactive* if it has not shown geologic evidence of surface displacement in the last 11,000 years.

According to the Fault Activity Map of California and Adjacent Areas, no active faults or Earthquake Fault Zones are located on the Project site. The nearest active fault is the Dunnigan Hills Fault Zone, approximately 46 miles northwest of the Project site (DOC 2015).

3.7.1.3 Paleontological Resources

The following information was obtained by the Paleontological Assessment Memorandum for the Alder Creek Property Project, Sacramento County, California (ECORP 2025d). ECORP conducted a paleontological record search through the Sierra College Museum of Natural History, Rocklin, California. There were no records of previous finds within the 1-mile buffer zone of the Project site. Outside a 1-mile radius, there is the possibility of fossil findings in the Cretaceous Chico Formation to the north and Pleistocene vertebrate locations to the north and south.

In addition to the record search results, ECORP conducted reviews of published and unpublished literature. One of the closest known fossil finds was the discovery of a late Pleistocene biota during the construction of the Arco Arena site in Sacramento, California. The fossils were recovered from overbank deposits of the Riverbank Formation and include Harlan's ground sloth (*Paramylodon harlani*), bison (*Bison antiquus*), coyote (*Canis* cf. *latrans*), horse (*Equus* sp.), camel (*Camelops hesternus*), a squirrel (cf. *Sciurus* sp.), an antelope (Antilocapridae) or deer (Cervidae); and mammoth (*Mammuthus* sp.). Plant fossils include unidentified leaf and a holly leaf cherry seed, *Prunus* cf. *ilicifolia*.

3.7.2 FPASP EIR/EIS Summary

With implementation of mitigation measures, impacts related to strong seismic ground shaking, construction-related erosion, construction in bedrock/rock outcroppings and landslides, subsurface water flows, and unsuitability for septic systems were found to be reduced to less than significant levels.

3.7.3 Geology and Soils Conformity Analysis

3.7.3.1 Alquist-Priolo Earthquake Fault Impacts

As described in Section 3.7.1, no active or inactive faults of Earthquake Fault Zones are located on the Project site. The analysis under the FPASP EIR/EIS remains accurate with respect to the proposed project. The mitigation measures included in the FPASP EIR/EIS would reduce potential impacts to less than significant. As such, impacts associated with the development of the proposed project would be

consistent with the analysis in the FPASP EIR/EIS and the proposed Project would not result in any significant impacts.

3.7.3.2 Topsoil and Erosion

As described in the FPASP EIR/EIS, the project would be required to comply with existing regulations and implement all identified mitigation measures, which would reduce potential impacts regarding soil erosion or the loss of topsoil to less than significant. The proposed Project would include the same development and uses as described in the FPASP EIR/EIS and is within the same boundaries as described in the FPASP EIR/EIS. The Project would not have impacts to soil erosion or the loss of topsoil beyond what was identified in the FPASP EIR/EIS. Therefore, the project would have a less than significant impact.

3.7.3.3 Landslide, Lateral Spreading, Liquefaction Impacts

The analysis under the Specific Plan FEIR remains accurate with respect to the proposed project. Implementation of all required mitigation measures would reduce project impacts associated with a geologic unit that or soil that is unstable, or that would become unstable to less than significant. The proposed Project would not have impacts to unstable geologic units or soil beyond what was identified in the FPASP EIR/EIS. Therefore, the project would have a less than significant impact.

3.7.3.4 Expansive Soil

As noted in the FPASP EIR/EIS, the project site is underlain by soils with low expansion potential. Compliance with required mitigation would reduce impacts associated with expansive soils. The proposed Project is in the same location as the project described in the FPASP EIR/EIS and would not be located on expansive soil beyond what was addressed in the FPASP EIR/EIS. As such, impacts associated with the project would be consistent with the analysis in the FPASP EIR/EIS and the proposed Project would not result in any significant impacts related to expansive soil.

3.7.3.5 Septic Tanks

As discussed in the FPASP EIR/EIS, the project would not include septic tanks or other alternative wastewater treatment methods. Therefore, the project would have no impact.

3.7.3.6 Paleontological Resources

Within California valley areas, late Pleistocene fossils typically appear anywhere from 8 to 10 feet in depth. The sensitivity for producing fossils may range from low (Holocene alluvium) to high (Pleistocene alluvium) with depth. Excavations should proceed with caution upon reaching depths near 8 feet and beyond. Due to the low sensitivity of the Project area to produce fossils, full paleontological monitoring is not recommended unless a find is made with depth. By following all required mitigation measures within the FSASP EIR/EIS, all impacts would be considered less than significant.

3.7.4 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.
7. The FPASP EIR/EIS included 11 mitigation measures (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to geology and minerals that the proposed Project would have to adhere to.

3.8 Greenhouse Gas Emissions

3.8.1 Environmental Setting

Greenhouse Gas (GHG) emissions are released as byproducts of fossil fuel combustion, waste disposal, energy use, land use changes, and other human activities. This release of gases, such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and chlorofluorocarbons, creates a blanket around the earth that allows light to pass through but traps heat at the surface, preventing its escape into space. While this is a naturally occurring process known as the greenhouse effect, human activities have accelerated the generation of GHGs beyond natural levels. The overabundance of GHGs in the atmosphere has led to an unexpected warming of the earth and has the potential to severely impact the earth's climate system.

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. CH_4 traps more than 25 times more heat per molecule than CO_2, and N_2O absorbs 298 times more heat per molecule than CO_2. Often, estimates of GHG emissions are presented in carbon dioxide equivalents (CO_2e). Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

3.8.2 Regulatory Setting

To provide guidance to local lead agencies on determining significance for GHG emissions in CEQA documents, SMAQMD has established operation GHG reduction thresholds. The GHG targets and reduction recommendations made by the SMAQMD have taken into consideration reports and guidelines from various state agencies and organizations, such as the *California Air Pollution Control Officers Association CEQA & Climate Change guidelines*, the CARB Scoping Plan, the California Natural Resource Agency's CEQA Guidelines, and other reputable sources. In February 2021, the SMAQMD revised the Greenhouse Gas Emissions Chapter within their CEQA Guide.

The SMAQMD has adopted both construction and operational thresholds for GHG emissions. Their construction thresholds establish a bright line threshold of 1,100 metric tons/year. For projects with operations, the SMAQMD has created an Operational Screening Level Table, which specifies land uses that are not expected to go over 1,100 metric tons/year and thus are sufficiently addressed in a CEQA analysis by qualitative measures. The Proposed Project falls outside of the Screening Table range, and thus is subject to a quantitative measure of analysis, including the implementation of SMAQMD Tier 1 Best Management Practices (BMPs). The Tier 1 BMPs are as follows:

- BMP 1 - projects shall be designed and constructed without natural gas infrastructure; and
- BMP 2 - projects shall meet the current CalGreen Tier 2 standards, except all electric vehicle capable spaces shall instead be electric vehicle ready.

Land use projects that are over the 1,100 metric tons of CO_2e per year level are subject to implementing Tier 2 BMPs (BMP 3):

- BMP 3 - Residential projects shall achieve a 15% reduction in vehicle miles traveled per resident, office projects shall achieve a 15% reduction in vehicle miles traveled per worker compared to existing average vehicle miles traveled for the county, or retail projects shall achieve a no net increase in total vehicle miles traveled.

These Tier 1 and Tier 2 BMPs would show consistency with the State's 2045 Carbon Neutrality Goal. If the Project achieves BMP 3, then the operational impact is considered less than significant, and no further analysis is needed. If a project cannot incorporate the required BMPs, other reductions or purchasing and retiring GHG/carbon offsets from a registry approved by the SMAQMD may be required. Carbon offsets are instruments that can be bought, sold, and traded. Like a stock or equity that represents a unit of ownership in a company, a carbon offset represents a unit of GHG emissions reductions. Each offset is essentially a certification that a certain quantity of GHG emissions has been avoided, prevented, or sequestered. Offset registries that the SMAQMD may approve have developed a broad consensus around the standards that are necessary to ensure that offsets are environmentally sound, namely, that offsets be real, permanent, quantifiable, verifiable, enforceable, and additional. Approved registries may include but are not limited to any of the following: (i) the Climate Action Reserve, the American Carbon Registry and Verra, which are all approved by CARB; (ii) any entity approved at any time by CARB to act as an "offset project registry" under the state's cap-and-trade program; (iii) other regulatory or voluntary credits that

demonstrate, based on substantial evidence, that the offsets are real, permanent, quantifiable, verifiable, enforceable, and additional.

The FPASP EIR/EIS addresses GHG-related issues related to the development of the entire FPASP, which includes the Project area. The Proposed Project will be subject to the MMRP adopted for the FPASP, including implementation of mitigation measures required to reduce GHG-related impacts. More specifically, mitigation measure 3A.4-2a states that each increment of new development within the FPASP must be compared to any SMAQMD-adopted thresholds established at the time of development.

The significance of the Project's GHG emissions is evaluated consistent with CEQA Guidelines Section 15064.4(b)(2) by considering whether the Project complies with applicable plans, policies, regulations, and requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. The City of Folsom may set a project-specific threshold based on the context of each particular project, including using the SMAQMD expert recommendation. For the Proposed Project, the SMAQMD's 1,100 metric tons of CO_2e per year threshold is used as the significance threshold. If the Proposed Project exceeds the bright line threshold of 1,100 metric tons/year with the implementation of Tier 1 BMPs, the Project will be required to implement Tier 2 BMPs.

Therefore, in order to be less than significant, the Proposed Project would need to adhere to all SMAQMD guidelines, policies, and thresholds.

3.8.3 FPASP EIR/EIS Summary

According to the EIR/EIS, with implementation of mitigation measures impacts would be reduced that are associated with temporary, short-term construction-related emissions of criteria air pollutants and precursors; long-term operation-related (regional) emissions of criteria air pollutants and precursors; exposure to TACs; and exposure to odorous emissions from construction activity; and exposure to odorous emissions from operation of the proposed corporation yard, but not to a less than significant level, because emissions and exposure levels would (or could potentially) still exceed applicable thresholds and, therefore, residual significant impacts would occur.

3.8.4 Greenhouse Gas Emissions Conformity Analysis

3.8.4.1 Methodology

This information was obtained from Appendix B, the Alder Creek Property Emissions Report (ECORP 2025a). GHG emission-related impacts were assessed in accordance with methodologies recommended by the SMAQMD and required by the FPASP EIR/EIS. Where GHG emissions quantification was required, emissions were modeled using the California Emissions Estimator Model version 2022.1. CalEEMod is a statewide land use emissions computer model designed to quantify potential GHG emissions associated with both construction and operations from a variety of land use projects. Construction-generated GHG emissions were calculated using CalEEMod model defaults for Sacramento County and information provided in the Project Description, such as the site acreage, lot acreages for each land use, and total amount of building square footage for the single-family homes. The fire station's building square footage was derived from the lot acreage provided and the building coverage provided in the City's Municipal

Code Section 17.11.060, which allows for 30 percent of the lot acreage. Operational GHG emissions were also calculated using CalEEMod model defaults and the information provided in the Project Description.

3.8.4.2 Construction and Operations Generated GHG Emissions

Construction-Generated Emission Analysis

Construction-related activities that would generate GHG emissions include worker commute trips, haul trucks carrying supplies and materials to and from the Project Site, and off-road construction equipment (e.g., dozers, loaders, excavators). Table 3.8-1 illustrates the specific construction generated GHG emissions that would result from construction of the Project. Once construction is complete, the generation of these GHG emissions would cease.

Table 3.8-1. Construction-Related Greenhouse Gas Emissions

Emissions Source	CO_2e (Metric Tons/Year)
Construction Calendar Year One	964
Construction Calendar Year Two	1,779
Construction Calendar Year Three	1,754
Construction Calendar Year Four	1,720
Construction Calendar Year Five	665
Maximum Annual Construction Emissions	**1,779**
SMAQMD Significance Threshold	*1,100*
Exceed SMAQMD Threshold?	**Yes**

Note: CO_2e = carbon dioxide equivalent; SMAQMD = Sacramento Metropolitan Air Quality Management District
Source: California Energy Emissions Module (CalEEMod) version 2022.1. Refer to Appendix 3.3-2 for Model Data Outputs.

As shown in Table 3.8-1, construction would result in the generation of a maximum of 1,779 metric tons of CO_2e during a single year of construction, which is above the SMAQMD significant threshold. However, all land uses designated in the Alder Creek Property development are aligned with the FPASP EIR/EIS designations and have therefore been accounted for in the EIR/EIS. The applicable GHG mitigations in the MMRP are intended to reduce the impacts of the Alder Creek Property development's emissions. The MMRP includes measures that reflect SMAQMD guidelines, specifically Specific Plan Mitigation Measure 3.A.4-1. Specific Plan Mitigation Measure 3.A.4-1 requires the Alder Creek Property development to implement additional measures to control construction-generated GHG emissions as recommended by the SMAQMD. Such reduction measures may reduce GHG exhaust emissions from the use of on-site equipment, worker commute trips, and truck trips carrying materials and equipment to and from the

development site, as well as GHG emissions embodied in the materials selected for construction. Further reduction measures are mentioned in the MMRP (Appendix 3.3-1). Adhering to this mitigation measure would mean that the Alder Creek Property development is compliant with the MMRP and would not result in GHG emissions greater than what was detailed in the EIR/EIS. Once construction is complete, the generation of these GHG emissions would cease. The Alder Creek Property development is consistent with the types, intensity, and patterns of land use evaluated by the FPASP EIR/EIS. Since the Alder Creek Property development is consistent with the land uses analyzed under the FPASP EIR/EIS, construction-related GHG impacts would be the same as analyzed in the EIR/EIS and there would not be an increase in the severity of impacts as a result of the Alder Creek Property development. There would not be a new or substantially more severe significant impact compared with the significance determination contained in the EIR/EIS.

Operations-Generated Emission Analysis

Operation of the Project would result in an increase in GHG emissions primarily associated with motor vehicle trips. Long-term operational GHG emissions attributed to the Project are identified in Table 3.8-2.

Table 3.8-2. Operational-Related Greenhouse Gas Emissions

Emission Source	CO_2e (Metric Tons/Year)
Mobile	21,126
Area Source	25
Energy	5,283
Waste	139
Water	300
Refrigeration	3
Total:	**26,876**
SMAQMD Significance Threshold	*1,100*
Exceed SMAQMD Threshold?	**Yes**

Notes: Emission projections predominately based on CalEEMod model defaults for Sacramento County. Average daily vehicle trips provided by ITE Trip Generation Manual. The Project will have no natural gas infrastructure to comply with Sacramento Metropolitan Air Quality Management District's (SMAQMD's) Tier 1 Best Management Practices, which prohibit natural gas infrastructure in all new operational Projects (see Mitigation Measure GHG-1). The emission projections take into account no natural gas infrastructure. CO_2e = Carbon Dioxide equivalent

Source: California Energy Emissions Module (CalEEMod) version 2022.1. Refer to Appendix B for Model Data Outputs.

As shown in Table 3.8-2, operations would result in 26,876 metric tons/year of CO_2e. The SMAQMD CEQA Guidance on GHG Emissions states that "Projects that exceed 1,100 metric tons/year after implementation of Tier 1 BMPs must implement Tier 2 BMPs (BMP 3)". As shown in Table 3.8-2, the GHG emissions produced by Project operations would exceed the 1,100 metric tons per year threshold with the implementation of Tier 1 BMPs. In order to ensure compliance with the SMAQMD guidelines, this development is subject to Tier 1 and Tier 2 BMPs.

In the case of the Tier 2 BMPs (BMP 3), the Alder Creek Property development is classified as a residential project, due to the majority of the land uses within the Alder Creek Property development being designated for single-family residences. Residential Tier 2 BMPs require the Alder Creek Property development to achieve a 15 percent reduction in vehicle miles traveled per resident. If the project achieves BMP 3, then the operational impact is considered less than significant, and no further analysis is needed. As previously mentioned, if a project cannot incorporate the required BMPs, other reductions or purchasing and retiring GHG/carbon offsets from a registry approved by the SMAQMD may be required. Approved registries may include but are not limited to any of the following: (i) the Climate Action Reserve, the American Carbon Registry and Verra, which are all approved by CARB; (ii) any entity approved at any time by CARB to act as an "offset project registry" under the state's cap-and-trade program; (iii) other regulatory or voluntary credits that demonstrate, based on substantial evidence, that the offsets are real, permanent, quantifiable, verifiable, enforceable, and additional.

Implementation of required SMAQMD Tier 1 and Tier 2 BMPs will ensure that the impacts associated with the Alder Creek Property development will be less than significant.

3.8.4.3 Conflict with the Applicable Plan for Reduction of Greenhouse Gas Emissions

The significance of the Project's GHG emissions is evaluated consistent with CEQA Guidelines Section 15064.4(b)(2) by considering whether the Project complies with applicable plans, policies, regulations and requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. The previous analysis prepared in the FPASP EIR/EIS found that the development of the FPASP would contribute to GHG emissions to a level that is significant and unavoidable despite the imposition of mitigation measures designed to reduce the Specific Plan's related GHG emissions impact. The Alder Creek Property development is subject to adherence to the MMRP, which directs all Projects that are developed as a part of the FPASP adhere to SMAQMD GHG thresholds and measures. As previously described, the Alder Creek Property development will be required to implement all possible SMAQMD BMP measures to reduce GHG emissions in order to comply with all regulations.

California promulgates several mandates and goals to reduce statewide GHG emissions, including the goal to reduce statewide GHG emissions to 40 percent below 1990 levels by the year 2030 (California Senate Bill [SB] 32). The Alder Creek Property development is subject to compliance with SB 32. As discussed previously, implementation of Tier 1 and Tier 2 BMPs ensure compliance with the SMAQMD's GHG planning and policies, which were prepared with the purpose of complying with statewide GHG-reduction efforts. Mitigation measure GHG-1 ensures that the development would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Thus, there is not a new or substantially more severe significant impact compared with the significance determination contained in the FPASP EIR/EIS.

3.8.5 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to

what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.
7. The FPASP EIR/EIS included 20 mitigation measures (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to air quality/greenhouse gas emissions that the proposed Project would have to adhere to.

3.9 Hazards and Hazardous Materials

3.9.1 Environmental Setting

A material is considered hazardous if it appears on a list of hazardous materials prepared by a federal, state, or local agency, or if it has characteristics defined as hazardous by such an agency. A hazardous material is defined by the California Health and Safety Code, Section 25501 as follows:

> "Hazardous material" means any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

A hazardous material is defined in 22 CCR Section 662601.10 as follows:

> A substance or combination of substances which, because of its quantity, concentration, or physical, chemical or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of or otherwise managed.

Transporters of hazardous waste in California are subject to several federal and state regulations. They must register with the California Department of Health Services (DHS) and ensure that vehicle and waste

container operators have been trained in the proper handling of hazardous waste. Vehicles used for the transportation of hazardous waste must pass an annual inspection by the California Highway Patrol (CHP). Transporters must allow the CHP or DHS to inspect its vehicles and must make certain required inspection records available to both agencies. The transport of hazardous materials that are not wastes is regulated by the U.S. Department of Transportation through national safety standards.

Other risks resulting from hazardous materials include the use of these materials in local industry, businesses, and agricultural production. The owner or operator of any business or entity that handles a hazardous material above threshold quantities is required by state and federal laws to submit a business plan to the local Certified Unified Program Agency (CUPA). The Sacramento County Environmental Management Department is designated by the State Secretary for Environmental Protection as the CUPA for Sacramento County in order to focus the management of specific environmental programs at the local government level. The CUPA program is designed to consolidate, coordinate, and uniformly and consistently administer permits and conduct inspection and enforcement activities throughout Sacramento County. This approach strives to reduce overlapping and sometimes conflicting requirements of different governmental agencies independently managing these programs. The County will refer large cases of hazardous materials contamination or violations to the Central Valley Regional Water Quality Control Board (RWQCB) (Region 5) and the Department of Toxic Substances Control (DTSC). It is not uncommon for other agencies, such as federal and state Occupational Safety and Health Administrations, to become involved when issues of hazardous materials arise.

3.9.1.1 Cortese Lists

Under Government Code Section 65962.5, both the DTSC and State Water Resources Control Board (SWRCB) are required to maintain lists of sites known to have hazardous substances present in the environment (Cortese List). Both agencies maintain up-to-date lists on their websites. The Project site is not listed on the DTSC (DTSC 2025). According to the SWRCB GeoTracker website, there are 67 remediated Aerojet cleanup sites within the Project Site (SWRCB 2025).

3.9.2 FPASP EIR/EIS Summary

According to the FPASP EIR/EIS, with implementation of mitigation measures, all potential impacts relating to hazards and hazardous material would be reduced to a less than significant level.

3.9.3 Hazards and Hazardous Materials Summary

3.9.3.1 Hazardous Materials Transportation

As noted in the FPASP EIR/EIS, all hazardous materials would be transported and handled in accordance with all federal, state, and local laws regulating the management and use of hazardous materials. The proposed Project would include the same development and uses as described in the FPASP EIR/EIS. As such, the project would be required to comply with all federal, state, and local laws regulating the management, use, storage, and transportation of hazardous materials.

For these reasons, the project would have a less than significant impact related to the routine transport, use, disposal, or release of hazardous materials.

3.9.3.2 Significant Hazard to the Public

As described in the FPASP EIR/EIS, the Specific Plan would result in less than significant impacts with mitigation incorporated associated with the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. The proposed Project would not result in hazardous materials beyond what was previously analyzed in the FPASP EIR/EIS. Therefore, the project would have a less than significant impact.

3.9.3.3 Cortese List

As mentioned above, review of Cortese List sites indicate that the project site is not listed as a hazardous waste site according to the EnviroStor but does have 67 sites according to the GeoTracker database. However, all sites have been identified as remediated and were all noted within the FPASP EIR/EIS. The proposed Project would not result in any impacts beyond what was previously analyzed in the FPASP EIR/EIS. Therefore, the project would have a less than significant impact.

3.9.3.4 Emergency Evacuation

The proposed Project would result in the same access and uses as analyzed in the FPASP EIR/EIS. As described in the FPASP EIR/EIS, the project's evacuation approach would be consistent with the City's and County's evacuation approach. The proposed Project would be consistent with the Specific Plan's guidelines and provide adequate emergency access throughout the project site. The Project is consistent with the roadway analysis included in the FPASP EIR/EIS and would provide adequate emergency access to the project site. The project site access, including road widths and connectivity, would be consistent with the City's roadway standards and all applicable requirements. Therefore, impacts would be less than significant

3.9.3.5 Wildfire

According to the FPASP EIR/EIS, the FPASP is located within a state responsibility area designated as a moderate fire hazard severity zone. It was determined to not be near an area of high or extremely high fire hazard severity. Therefore, the FPASP EIR/EIS found that implementation would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas and it was not discussed further within the EIR/EIS.

3.9.4 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.
7. The FPASP EIR/EIS included 14 mitigation measures (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to hazards that the proposed Project would have to adhere to.

3.10 Hydrology and Water Quality

3.10.1 Environmental Setting

3.10.1.1 Regional Hydrology

Surface Water

The main surface waters in Sacramento County are related to the American and Sacramento River systems. The American River watershed covers approximately 2,100 square miles northeast of Sacramento. The watershed spans portions of three different counties: Sacramento, El Dorado, and Placer. The average annual runoff is approximately 2.7 million acre-feet. In the past, annual runoff has varied from 900,000 acre-feet to 5,000,000 acre-feet. The American River watershed, including all its tributaries, is divided into three major sub-basins, the North Fork American River, the South Fork American River and the Lower Fork American River. The Lower Fork American River sub- basin begins at Folsom Dam and extends 30 miles downstream to the mouth of the American River at the confluence of the Sacramento River. The Lower American Basin contains eight dams and has 380 miles of naturally occurring waterways. The precipitation in the Lower American River basin averages 20.83 inches per year. North of Highway 50, storm drains collect and convey urbanized runoff into Willow Creek, Humbug Creek, Hinkle Creek, Gold Creek, and Alder Creek; all of which drain into the Lower American River. Hinkle Creek and Gold Creek drain the northwestern portion of Folsom north of the American River, while Willow Creek and Humbug Creek drain the southeastern portion of the City. Although Alder Creek only drains a small portion north of Highway 50, it drains most of Folsom south of U.S. 50 (City of Folsom 2011).

Water Quality

The City of Folsom obtains all of its potable water supply from Folsom Lake. The City's current water rights amount to 34,000 acre-feet of raw water per year. Raw water from Folsom Lake is treated at the City Water Treatment Plant (WTP). The treatment plant has a nominal capacity of 50 million gallons per day (mgd). Recent annual deliveries from the WTP have been less than half of its annual capacity of approximately 50,000 acre-feet (City of Folsom 2014).

Groundwater

The portions of Folsom south of the American River are located in the South American sub-basin. The South American Sub-basin has inflows including natural and applied water recharge of 257,168 acre-feet and a net subsurface outflow of 29,676 acre-feet annually. The South American Sub-basin is approximately 248,000 acres, or 388 square miles. Groundwater is typically of calcium magnesium bicarbonate or magnesium calcium bicarbonate. Other minor groundwater types include a sodium calcium bicarbonate or calcium bicarbonate or sodium magnesium bicarbonate near the confluence of the Sacramento and American Rivers. Total Dissolved Solids (TDS) ranges from 24 to 581 milligrams per liter (mg/L) and averages 221 mg/L based on 462 records (California Department of Water Resources 2020). A range of 500 TDS is desired for agricultural uses, any range above that requires slight restrictions on water use (City of Folsom 2014).

3.10.2 FPASP EIR/EIS Summary

According to the FPASP EIR/EIS, with implementation of required mitigation, the Project would not result in any residual significant impacts related to short-term alteration of drainages and associated surface water quality and sedimentation, increased risk of flooding or hydromodification from stormwater runoff, water quality and hydrology effects from long-term urban runoff, or groundwater recharge.

3.10.3 Hydrology and Water Quality Conformity Analysis

3.10.3.1 Water Quality

As discussed in the FPASP EIR/EIS, onsite drainage improvement as well as compliance with all existing water quality regulations and implementation of Stormwater Pollution Prevention Plan requirements would ensure impacts to water quality standards or waste discharge requirements would be less than significant. The Project includes the same drainage improvements as described in the FPASP EIR/EIS and would not result in impacts to water quality standards or waste discharge requirements beyond what was identified in the FPASP EIR/EIS.

3.10.3.2 Groundwater Supplies

The FPASP EIR/EIS concluded that there was sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years. The Project would include the same development and uses as described in the FPASP EIR/EIS and would not impact

groundwater beyond what was identified in the FPASP EIR/EIS. The Project would be required to follow all required mitigation measures outlined in the FPASP EIR/EIS.

3.10.3.3 Drainage Pattern

The FPASP EIR/EIS concluded that impacts regarding altering the existing drainage pattern of the site would be less than significant. With the inclusion required mitigation measures, impacts to erosion would be less than significant. The Project would include the same development and uses as described in the FPASP EIR/EIS and is in the same location as described in the FPASP EIR/EIS. The analysis under the FPASP EIR/EIS remains accurate with respect to the proposed project. The Project would not substantially alter the existing drainage pattern of the site beyond what was identified in the FPASP EIR/EIS.

3.10.3.4 Flood Impacts

As stated in the FPASP EIR/EIS, impacts associated with flood hazard, tsunami, or seiche zones, and risk release of pollutants due to project inundation would be less than significant. FPASP EIR/EIS states that the site is not in an area protected by levees; however, Folsom Dam is located approximately 4.5 miles north of the Specific Plan Area. However, according to the FPASP EIR/EIS, the Specific Plan Area is outside of the mapped inundation area. The Project would include the same development and uses as described in the FPASP EIR/EIS and is in the same location as described in the FPASP EIR/EIS. The analysis under the FPASP EIR/EIS remains accurate with respect to the proposed project.

3.10.3.5 Conflict with Any Approved Water Quality or Groundwater Plans

The FPASP EIR/EIS states that the project would be consistent with objectives and policies identified in the Basin Plan and therefore would not obstruct implementation of a water quality plan or sustainable groundwater management plan. The Project includes features consistent with the Specific Plan FEIR, therefore, the analysis under the Specific Plan FEIR remains accurate with respect to the proposed project. Therefore, the project would not obstruct implementation of a water quality plan or sustainable groundwater management plan; thus, impacts would be less than significant.

3.10.4 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.

4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.
7. The FPASP EIR/EIS included eight mitigation measures (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to hydrology that the proposed Project would have to adhere to.

3.11 Land Use and Planning

3.11.1 Environmental Setting

The FPASP consists of over 3,510 acres that is generally located in eastern Sacramento County, within the City of Folsom (City of Folsom 2011). The Specific Plan area has already started to be built out.

3.11.2 FPASP EIR/EIS Summary

Agriculture resources and land use impacts were combined into one section the FPASP EIR/EIS. The EIR/EIS determined that there was no feasible mitigation available to reduce the impacts to Sacramento Area Council of Governments (SACOG) Preferred Blueprint Scenario with implementation of the FPASP to a less than significant level. Additionally, with the General Plan Amendment that was required for the FSPASP, impacts were considered significant and unavoidable.

3.11.3 Land Use and Planning Conformity Analysis

3.11.3.1 Land Use Changes

As mentioned above in the Project Description, the Project is proposing a slight variation to the land use designations that were originally approved in the original FPASP EIR/EIS. However, this change is minimal and would result in no impacts to the land use designations. Therefore, the analysis under the FPASP EIR/EIS remains accurate with respect to the proposed project. Additionally, the Project would be required to adhere to all mitigation measures listed in the FPASP EIR/EIS.

3.11.4 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.

2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.
7. The FPASP EIR/EIS included two mitigation measures (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to land use and agriculture resources that the proposed Project would have to adhere to.

3.12 Mineral Resources

3.12.1 Environmental Setting

Minerals are defined as any naturally occurring chemical elements or compounds formed by inorganic processes and organic substances. Minable minerals are defined as a deposit of ore or minerals having a value materially in excess of the cost of developing, mining, and processing the mineral and reclaiming the project area. The conservation, extraction, and processing of mineral resources is essential to meeting the needs of society.

The Surface Mining and Reclamation Act of 1975 (SMARA) states that cities and counties shall adopt ordinances "...that establish procedures for the review and approval of reclamation plans and financial assurances and the issuance of a permit to conduct surface mining operations..." (PRC Section 2774). The intent of this legislation is to ensure the prevention or mitigation of the adverse environmental impacts of mining, the reclamation of mined lands, and the production and conservation of mineral resources are consistent with recreation, watershed, wildlife, and public safety objectives (PRC Section 2712).

SMARA requires the State Geologist to classify land into Mineral Resource Zones (MRZs) according to the known or inferred mineral potential of that land. The process is based solely on geology, without regard to existing land use or land ownership. The primary goal of mineral land classification is to ensure that the mineral potential of land is recognized by local government decision makers and considered before land use decisions, which could preclude mining, are made. Areas subject to California mineral land classification studies are divided into the following MRZ categories that reflect varying degrees of mineral potential:

- MRZ-1: Areas of no mineral resource significance
- MRZ-2: Areas of identified mineral resource significance
- MRZ-3: Areas of undetermined mineral resource significance

- MRZ-4: Areas of unknown mineral resource significance

According to the FPASP EIR/EIS, the Specific Plan Area is in areas that are either zoned MRZ-1 for construction aggregate (where no mineral resources are present) or are located in MRZ-3 construction aggregate areas that have already been developed with urban uses (where any resources that may have been present have been covered over by development and are no longer available for extraction). In 2003, the City of Folsom determined that because it did not have any active mining operations, and because none were expected in the future, that it would not update its SMARA ordinance. The Specific Plan Area is not delineated as an area of known mineral resources in either the City of Folsom or Sacramento County General Plans.

3.12.2 FPASP EIR/EIS Summary

According to the FPASP EIR/EIS, if economically valuable kaolin clay deposits were found to be present in the Project Area, they would be covered over as a result of SPA development with urban land uses and would no longer be available for mining. Therefore, this impact is considered potentially significant and unavoidable.

3.12.3 Mineral Resources Conformity Analysis

3.12.3.1 Mineral Resources

The project site is located within an area mapped as MRZ-3 which indicates areas of undetermined mineral resource significance (DOC 2018). Because the project site does not contain known mineral resources of value, impacts would remain as identified in the Specific Plan FEIR. The project would have no impact on mineral resources.

3.12.4 Conclusion

The proposed project is consistent with the development evaluated in the Specific Plan FEIR and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.

6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.

7. The FPASP EIR/EIS included 11 mitigation measures (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to geology and minerals that the proposed Project would have to adhere to.

3.13 Noise

3.13.1 Environmental Setting

3.13.1.1 Noise Fundamentals

Noise is generally defined as sound that is loud, disagreeable, or unexpected. The selection of a proper noise descriptor for a specific source is dependent on the spatial and temporal distribution, duration, and fluctuation of the noise. The noise descriptors most often encountered when dealing with traffic, community, and environmental noise include the average hourly noise level (in L_{eq}) and the Average Daily Noise Levels/Community Noise Equivalent Level (in Ldn/CNEL). The L_{eq} is a measure of ambient noise, while the Ldn and CNEL are measures of community noise. Each is applicable to this analysis and defined as follows:

- Equivalent Noise Level (L_{eq}) is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.

- Day-Night Average (Ldn) is a 24-hour average L_{eq} with a 10-A-weighted decibel (dBA) *weighting* added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA Ldn.

- Community Noise Equivalent Level (CNEL) is a 24-hour average L_{eq} with a 5-dBA weighting during the hours of 7:00 pm to 10:00 pm and a 10-dBA weighting added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the evening and nighttime, respectively.

Noise can be generated by a number of sources, including mobile sources, such as automobiles, trucks and airplanes, and stationary sources, such as construction sites, machinery, and industrial operations. Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 decibels (dB) for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics (Federal Highway Administration [FHWA] 2017a). Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed (FHWA 2017a).

Noise levels may also be reduced by intervening structures; generally, a single row of detached buildings between the receptor and the noise source reduces the noise level by about 5 dBA (FHWA 2006), while a solid wall or berm generally reduces noise levels by 5 to 10 dBA (FHWA 2017b). According to the FHWA (2017b), noise barriers can reduce noise levels by 15 dBA in certain instances, yet this level of noise reduction is very difficult to achieve. To achieve the most potent noise-reducing effect, a noise enclosure/barrier must physically fit in the available space, must completely break the "line of sight" between the noise source and the receptors, must be free of degrading holes or gaps, and must not be flanked by nearby reflective surfaces. Noise barriers must be sizable enough to cover the entire noise source and extend lengthwise and vertically as far as feasibly possible to be most effective. The limiting factor for a noise barrier is not the component of noise transmitted through the material, but rather the amount of noise flanking around and over the barrier. In general, barriers contribute to decreasing noise levels only when the structure breaks the "line of sight" between the source and the receiver.

The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows (Caltrans 2002). The exterior-to-interior reduction of newer residential units is generally 30 dBA or more (Harris Miller, Miller & Hanson Inc. 2006). Generally, in exterior noise environments ranging from 60 dBA CNEL to 65 dBA CNEL, interior noise levels can typically be maintained below 45 dBA, a typical residential interior noise standard, with the incorporation of an adequate forced air mechanical ventilation system in each residential building, and standard thermal-pane residential windows/doors with a minimum rating of Sound Transmission Class (STC) 28. (STC is an integer rating of how well a building partition attenuates airborne sound. In the U.S., it is widely used to rate interior partitions, ceilings, floors, doors, windows, and exterior wall configurations). In exterior noise environments of 65 dBA CNEL or greater, a combination of forced-air mechanical ventilation and sound-rated construction methods is often required to meet the interior noise level limit. Attaining the necessary noise reduction from exterior to interior spaces is readily achievable in noise environments experiencing less than 75 dBA CNEL with proper wall construction techniques following California Building Code methods, the selections of proper windows and doors, and the incorporation of forced-air mechanical ventilation systems.

3.13.1.2 Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60- to 70-dBA range, and high, above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night

can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in dBA, the following relationships should be noted in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1.0 dBA cannot be perceived by humans.
- Outside of the laboratory, a 3.0-dBA change is considered a just-perceivable difference.
- A change in level of at least 5.0 dBA is required before any noticeable change in community response would be expected. An increase of 5.0 dBA is typically considered substantial.
- A 10.0-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

3.13.1.3 Noise Sensitive Land Uses

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as hospitals, historic sites, cemeteries, and certain recreation areas are considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses.

As noted in the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the FPASP, the nearest existing sensitive receptors include Folsom High School and single-family homes accessible via Iron Point Road approximately 2,000 feet north of the Alder Creek Property development's northern boundary. The nearest future noise-sensitive land receptors are single-family homes (both low and high density units) directly adjacent to the southern boundary of the Alder Creek Property development site, fronting Mangini Parkway and a currently unmarked roadway that bisects Prairie City Road, multi-family high density units directly adjacent to the northwestern boundary of the Project Site, fronting Prairie City Road, and elementary, middle, and high schools directly adjacent to the Proposed Project's southern and southwestern boundaries.

Additionally, the Alder Creek Property development would lead to the development of new receptors sensitive to noise and vibration impacts. While specific future site plans under the Alder Creek Property development are currently unknown, the development is consistent with the types, intensity, and patterns of land use evaluated by the FPASP EIR/EIS.

3.13.1.4 Vibration Fundamentals

Ground vibration can be measured several ways to quantify the amplitude of vibration produced, including through peak particle velocity or root mean square velocity. These velocity measurements measure maximum particle at one point or the average of the squared amplitude of the signal, respectively.

Vibration impacts on people can be described as the level of annoyance and can vary depending on an individual's sensitivity. Generally, low-level vibrations may cause window rattling but do not pose any threats to the integrity of buildings or structures.

3.13.1.5 Existing Ambient Noise Environment

The most common and significant sources of noise in the Project Area will be traffic and common activity typical of residential neighborhoods, as the area surrounding the Project Site is currently a developing residential community. As shown in Table 3.13-1 below, the ambient recorded noise levels range from 56.5 to 76.7 dBA L_{eq} near the Project Site.

3.13.1.6 Existing Ambient Noise Measurements

The development site is located in the western portion of the FPASP. The development site is currently vacant and surrounded by a developing residential community as a part of the FPASP. To quantify existing ambient noise levels in the Project Area, ECORP Consulting, Inc. conducted four short-term (15-minute) noise measurements in areas around the Project Site on the afternoon of February 25, 2025. These short-term noise measurements are representative of typical daytime noise exposure adjacent to the development site's southern boundary (see Appendix C, Noise). The measurements were taken between 1:02 p.m. and 2:13 p.m. Average noise levels at each location are listed in Table 4.13-1.

Table 3.13-1. Existing (Baseline) Noise Measurements

Location Number	Location	dBA			Time
		L_{eq}	L_{min}	L_{max}	
ST 1*	Adjacent to corner of Oak Avenue and Mangini Parkway	56.5	37.0	73.1	1:02 p.m. – 1:17 p.m.
ST 2	Adjacent to corner of Oak Avenue Parkway and Gateway Drive	59.2	40.5	77.5	1:20 p.m. – 1:35 p.m.
ST 3	Adjacent to corner of Oak Avenue Parkway and White Rock Road	64.3	41.3	76.8	1:38 p.m. – 1:53 p.m.
ST 4	Adjacent to corner of White Rock Road and Scott Road	76.7	41.9	87.9	1:58 p.m. – 2:13 p.m.

Notes: L_{eq} is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. L_{min} is the minimum noise level during the measurement period and L_{max} is the maximum noise level during the measurement period.
*ST 1 was taken nearest the development site's southern boundary.

Table 3.13-1. Existing (Baseline) Noise Measurements					
Location Number	Location	dBA			Time
		L_{eq}	L_{min}	L_{max}	

Source: Measurements were taken by ECORP with a Larson Davis SoundExpert 821 precision sound level meter, which satisfies the American National Standards Institute for general environmental noise measurement instrumentation. Prior to the measurements, the SoundExpert 821 sound level meter was calibrated according to manufacturer specifications with a Larson Davis CAL200 Class I Calibrator.

As shown in Table 3.13-1, ambient recorded noise levels range from 56.5 to 76.7 dBA Leq across the four short-term noise measurements taken in the Project vicinity. The predominant sources of noise in the area include fast-moving vehicular traffic on White Rock Road, pedestrians walking by, and nearby construction activity. Measurement Site 4 recorded the highest noise levels. This measurement was not only influenced by the fast-moving vehicular traffic on White Rock Road, but also the rapid braking of vehicular traffic on Scott Road as it approached the stop sign at the White Rock Road/Scott Road intersection, and rapid acceleration of this same traffic onto White Rock Road.

Noise measurements were also collected in 2009 for the FPASP EIR/EIS analysis. Since then, no new development has occurred in the immediate vicinity of the Proposed Project. The nearest 2009 measurement site, Site C, was located on Prairie City Road, approximately 1,400 feet from the development boundary. Noise levels at that location were 58.1 dBA L_{eq} during the daytime hours (7:00 a.m. to 10:00 p.m.) and 51.9 dBA L_{eq} during the nighttime hours (10:00 p.m. to 7:00 a.m.), with an L_{dn}/CNEL of 60.0 dBA. The FPASP EIR/EIS found that vehicular traffic on U.S. 50 and White Rock Road was the primary source of noise at most measurement locations.

3.13.2 FPASP EIR/EIS Summary

According to the EIR/EIS, with implementation of mitigation measures, impacts associated with temporary, short-term exposure of sensitive receptors, ground borne noise, and vibration from project construction and the long-term exposure of sensitive receptors to increased operational traffic noise levels from project operation, would be reduced but not to a less than significant level. This is because noise levels would (or could potentially) still exceed applicable thresholds and, therefore, residual significant impacts would occur. All other noise impacts were found to be reduced to a less than significant level following implementation of mitigation measures.

3.13.3 Noise Conformity Analysis

3.13.3.1 Construction Noise Analysis - Onsite Construction Noise

This information was obtained from Appendix C, Roadway Construction Noise, and D, the Alder Creek Property Emissions Report (ECORP 2025b and 2025c). The Alder Creek Property development is proposing the construction and operation of a fire station and 1,424 residential lots with varying zoning densities. All thirteen proposed lot sizes comply with the zoning designations and density requirements in the City of Folsom's General Plan and the FPASP. The Alder Creek Property development also proposes land uses

such as private recreation, parks, landscaping, open space, and roadways as a part of the developing FPASP.

Construction noise would be temporary and vary depending on the nature of specific activities. Noise generated would primarily be associated with the operation of off-road equipment for onsite construction activities as well as construction vehicle traffic on area roadways. Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., site preparation, excavation, paving). Noise generated by construction equipment, including earth movers, pile drivers, and portable generators, can reach high levels. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts). During construction, exterior noise levels could negatively affect sensitive land uses in the vicinity of the construction site.

The FPASP EIR/EIS was certified by the City Council on June 14, 2011. The FPASP EIR/EIS evaluates noise impacts, including noise and vibrational impacts associated with construction and operation of development projects within the Folsom Plan Area. The previous analysis prepared in the FPASP EIR/EIS found that construction activities associated with the development of the FPASP would result in a direct, significant impact despite the imposition of several mitigation measures that reduce the FPASP construction impact. These measures (listed as Mitigation Measure 3A.11-1 in Appendix A) include the requirement that all construction contractors building in the FPASP implement a noise control plan and monitor and record construction noise near sensitive receptors. A Mitigation Monitoring and Reporting Program (MMRP) was prepared and adopted with the FPASP and is a binding document applicable to the Alder Creek Property development. The Alder Creek Subdivision Site is subject to the noise–reducing mitigation measures contained in the Specific Plan EIR/EIS.

The FPASP EIR/EIS projected that the existing noise sensitive receptors located in the City of Folsom would not be affected by construction noise during the daytime hours due to the intervening location of U.S. 50 that serves as a major dominating noise source. However, as the FPASP buildout occurs, sensitive residential receptors would be added to the area and may become operational while construction of other residential developments proposed by the FPASP is in progress. Since specific future site plans under the Alder Creek Property development are unknown at this time, it is conservatively assumed that the construction areas associated with this development could be located within 50 feet of sensitive receptors. According to the California Emissions Estimator Model (CalEEMod), which is designed to model emissions for land use development projects based on typical construction requirements, the phase with the highest quantity of construction equipment for the buildout of the Alder Creek Property development is the building construction phase. It is acknowledged that construction equipment would generally be distributed across the site rather than concentrated in one area, resulting in varying distances between equipment and nearby sensitive receptors. The anticipated short-term construction noise levels generated for the necessary equipment at a distance of 50 feet are presented in Table 3.13-2.

Table 3.13-2. Construction Average (dBA) Noise Levels at Nearest Receptors		
Construction Phase	**Ambient Noise Levels* (L_{eq})**	**Existing Ambient Noise + Exterior Construction Noise Levels (L_{eq})**
Building Construction	56.5	88.1

Notes: *Ambient noise level is the nearest short-term noise measurement to the Alder Creek Property development area taken on February 25, 2025, and identified in Table 4.13-1.
Construction equipment used during construction was identified using the California Emissions Estimator Model (CalEEMod), version 2022.1. CalEEMod is a statewide land use emissions computer model designed to quantify potential criteria pollutant emissions for land use development projects, based on typical construction requirements. CalEEMod creates the construction assumptions, including construction equipment and duration, used in this analysis. Since specific future site plans under the Alder Creek Property development are unknown at this time, it is assumed that the construction areas associated with the future development could be located within 50 feet of sensitive structures.
L_{eq} = The equivalent energy noise level, is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
Source: Construction noise levels were calculated by ECORP Consulting using the FHWA Roadway Noise Construction Model (FHWA 2006). Refer to Appendix C for Model Data Outputs.

As shown in Table 3.13-2, construction activities could reach up to 88.1 dBA Leq. It is noted that construction noise was modeled on a worst-case basis. It is very unlikely that all pieces of construction equipment would be operating at the same time.

The City of Folsom does not promulgate a numeric threshold pertaining to the noise associated with construction (City of Folsom 2024a). This is because construction noise is temporary, short term, intermittent in nature, and would cease on completion of construction. Instead, the City regulates construction noise by limiting it to the daytime hours, the portion of the day when such noise is generally accepted. Specifically, the City's Municipal Code Chapter 8.42.060 prohibits construction taking place before 7:00 a.m. or after 6:00 p.m. on any day except Saturday or Sunday, or before 8:00 a.m. or after 5:00 p.m. on Saturday or Sunday. Adherence with this regulation would ensure compliance with the City's construction noise standard. Although the City of Folsom exempts daytime construction noise from the applicable standards, the FPASP EIR/EIS considered construction noise for projects under the FPASP as a direct, significant impact. The Alder Creek Property development is consistent with the types, intensity, and patterns of land use evaluated by the FPASP EIR/EIS. Therefore, since the Alder Creek Property development is consistent with the land uses analyzed under the FPASP EIR/EIS, construction noise impacts would be the same as analyzed in the EIR/EIS and there would not be an increase in the severity of construction noise impacts as a result of the Alder Creek Property development. There would not be a new or substantially more severe significant impact compared with the significance determination contained in the EIR/EIS.

3.13.3.2 Construction Noise Analysis – Offsite Construction Worker Trips

Construction of the Alder Creek Property development would result in additional traffic on adjacent roadways over the period that construction occurs. According to the CalEEMod, which is designed to model emissions for land use development projects based on typical construction requirements, including construction equipment duration and the number of construction-related automotive trips, the maximum

number of construction trips traveling to and from the Alder Creek Property development site during a single construction phase is expected to be 969 daily trips in total. According to *Caltrans Technical Noise Supplement to the Traffic Noise Analysis Protocol* (2013), a doubling of traffic on a roadway is required to result in an increase of 3 dB (outside of the laboratory, a 3-dBA change is considered a just-perceivable difference). The development site is currently accessible from Prairie City Road and is proposed within the FPASP, which is planned to accommodate 10,210 residential units at various densities, as well as 362.8 acres of commercial, industrial, and public uses, including a fire station.

Baseline average daily traffic volumes for several roadway segments throughout the City of Folsom were included in the 2035 General Plan Amendment (City of Folsom 2024b). The roadway segment bordering the eastern boundary of the Alder Creek Property development site (Prairie City Road from U.S. 50 to White Rock Road) was included in the General Plan Amendment analysis, which identified a baseline average daily traffic volume of 11,008 vehicles (City of Folsom 2024b). Thus, the maximum of 969 daily trips generated during construction would not result in a doubling of traffic, and therefore its contribution to existing traffic noise would not be perceptible. Additionally, it is noted that construction is temporary, and these trips would cease upon completion of construction. The FPASP EIR/EIS deemed that construction traffic noise would not result in a substantial temporary or periodic increase in ambient noise levels in the FPASP vicinity above levels existing without the FPASP. As a result, the FPASP EIR/EIS deemed construction traffic noise would be a less than significant impact. The Alder Creek Property development is consistent with the types, intensity, and patterns of land use evaluated by the FPASP EIR/EIS. Therefore, since the Alder Creek Property development is consistent with the land uses analyzed under the FPASP EIR/EIS, construction traffic noise impacts would be the same as analyzed in the EIR/EIS and there would not be an increase in the severity of construction traffic noise impacts as a result of the Alder Creek Property development. There would not be a new or substantially more severe significant impact compared with the significance determination contained in the EIR/EIS.

3.13.3.3 Operational Noise Analysis

Noise-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, hospitals, guest lodging, libraries, and some passive recreation areas would each be considered noise-sensitive and may warrant unique measures for protection from intruding noise. The nearest existing sensitive receptors to the Alder Creek Property site include Folsom High School and single-family homes located approximately 2,000 feet north of the Project's northern boundary. The nearest future sensitive receptors are residential units and schools directly adjacent to the Project Site, including single- and multi-family homes along Prairie City Road, Mangini Parkway, and surrounding areas. The Proposed Project would also introduce new noise-sensitive uses consistent with those anticipated in the FPASP EIR/EIS.

The FPASP EIR/EIS, certified by the City Council on June 14, 2011, includes an MMRP to address noise and vibration impacts on nearby sensitive receptors. The Alder Creek Subdivision Site is located within the FPASP and is thus subject to the noise–reducing mitigation measures contained in the Specific Plan EIR/EIS. The previous analysis prepared in the FPASP EIR/EIS found that Project implementation would result in long-term increases in daily traffic volumes on roadway segments in the area. Increased traffic

volumes would result in a substantial increase in ambient noise levels on- and off-site at nearby noise-sensitive receptors (City of Folsom 2011). The FPASP EIR/EIS requires all project applicants of all project phases to implement noise reduction standards for buildings and conduct site-specific acoustical analyses for roadway noise impacts. Specifically, construction of noise-sensitive land uses (i.e., residential dwellings and school classrooms) must produce a minimum composite STC rating for buildings of 30 or greater. The MMRP was prepared and adopted with the FPASP and is a binding document applicable to the Alder Creek Property development. The specific mitigations in the MMRP applicable to Proposed Project's operations are FPASP EIR/EIS measures 3A.11-4 and 3A.11-5 (see Appendix A).

3.13.3.4 Operational Traffic Noise

The FHWA roadway noise prediction model is used to calculate the noise levels from the existing average daily traffic volumes currently accommodated by Prairie City Road, as reported in the City of Folsom's 2035 General Plan Amendment. Existing traffic noise is then compared to the predicted noise levels resulting from the Alder Creek Property development's traffic contributions. The segment of Prairie City Road from U.S. 50 to White Rock Road, which borders the eastern boundary of the Alder Creek Property development, accommodates a baseline average daily traffic volume of 11,008 vehicles (City of Folsom 2024b). Based on this volume, existing traffic noise on this segment is estimated as 71.5 dBA CNEL (see Appendix D).

The Alder Creek Property development includes a fire station and 1,424 residential lots with varying densities. According to CalEEMod, which applies information from the Institute of Transportation Engineers' Trip Generation Manual, residential uses of this scale are expected to generate up to 13,585 trips per day. Because CalEEMod does not include a category for fire stations, a comparable "government office building" land use was used to estimate operational trips from the fire station and projected 561 trips per day. In total, the Alder Creek Property development could generate approximately 14,146 daily vehicle trips. These additional trips would contribute to increased traffic noise levels.

Using the FHWA model and applicable trip generation rates, the combined traffic from the Alder Creek Property development and existing baseline volumes is projected to result in a noise level of 75.1 dBA CNEL, which is an increase of 3.6 dBA over existing conditions (75.1 dBA – 71.5 dBA = 3.6 dBA (see Appendix C). Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference. Thus, the Alder Creek Property development's contribution of traffic noise would result in a perceivable increase in traffic noise levels.

The FPASP EIR/EIS previously evaluated operational traffic noise to determine whether cumulative projects allowed under the FPASP would result in substantial noise increases. The FPASP EIR/EIS found that FPASP implementation would result in significant impacts on numerous roadway segments due to permanent increases in ambient noise levels at on- and off-site sensitive receptors. The Alder Creek Property development is consistent with the types, intensity, and patterns of land use evaluated by the FPASP EIR/EIS. Therefore, since the Alder Creek Property development is consistent with the land uses analyzed under the FPASP EIR/EIS, traffic noise impacts would be the same as analyzed in the EIR/EIS and there would not be an increase in the severity of traffic noise impacts as a result of the Alder Creek Property

development. There would not be a new or substantially more severe significant impact compared with the significance determination contained in the EIR/EIS.

3.13.3.5 On-Site Operational Noise

Operational noise generated by the proposed residential units and fire station is anticipated to be consistent with the type and intensity of noise levels previously evaluated in the FPASP EIR/EIS. Primary residential noise sources would include mechanical equipment and typical neighborhood sounds such as barking dogs, internal traffic circulation, power tools and landscaping equipment, radios, and people talking. The proposed fire station would produce intermittent high noise levels from sirens and emergency vehicle movement; however, the City exempts any equipment or mechanical noise associated with emergency services in Section 8.42.060(B) of the Municipal Code. Potential stationary noise sources associated with both residential and fire station uses, such as heating, ventilation, and air conditioning (HVAC) systems and emergency generators, were previously assessed in the FPASP EIR/EIS and determined to be direct, potentially significant impacts under applicable City standards.

The City of Folsom's Municipal Code contains interior and exterior noise standards that may not be exceeded when measured at any affected single- or multi-family residence, school, church, hospital or public library. Exterior noise is limited to 50 dBA during the day (between the hours of 7:00 a.m. and 10:00 p.m.) and 45 dBA during the night (between the hours of 10:00 p.m. to 7:00 a.m.) for more than 30 minutes in any one-hour period, with absolute maximum thresholds of 70 dBA (daytime) and 65 dBA (nighttime).

According to the FPASP EIR/EIS analysis, HVAC equipment noise can vary from 45 to 70 L_{eq} at 50 feet, potentially exceeding City thresholds. Although noise from emergency equipment is exempt, the FPASP EIR/EIS still assessed routine generator maintenance. Reference data indicate noise levels from generators (50–125 kilowatts) can range from 61 to 73 dB L_{eq} and 63 to 84 dB L_{max} at 45 feet. Generators within 700 feet of sensitive receptors may exceed daytime standards, while those within 1,200 feet may exceed nighttime standards, resulting in a potentially significant impact.

According to previous field noise measurements conducted by ECORP, residential HVAC equipment generates noise levels less than 45 dBA at 20 feet, which is within City noise limits. Additionally, previous field measurements within six different residential neighborhoods, including two multi-family neighborhoods, two single-family neighborhoods, and two mixed density neighborhoods identify an average daytime noise environment of 51.9 dBA, which is under the City's daytime standard for 15-minute increments but exceeds the City's daytime standard of no more than 50 dBA during a 30-minute period.

The Alder Creek Property development proposes residential uses adjacent to other residential areas, which is a fundamental planning strategy to minimize noise conflicts. As the Alder Creek Property development's proposed land uses are consistent with those evaluated in the FPASP EIR/EIS, no new or substantially different significance determination is anticipated. The Alder Creek Property development must implement Mitigation Measure 3A.11-5 of the EIR/EIS (see Appendix A), which implements measures to reduce noise from Project-generated stationary sources.

3.13.3.6 Noise/Land Use Compatibility

Consistent with FPASP EIR/EIS Cumulative Mitigation Measure NOISE-1, this analysis evaluates whether proposed residential uses on the Project Site would be exposed to interior noise levels of 45 dBA CNEL due to roadway traffic, including quarry truck traffic, on Prairie City Road. As previously described, Prairie City Road can be expected to generate noise levels of 75.1 dBA CNEL at 50 feet from centerline after the Alder Creek Property development is operational. This is comparable to the FPASP EIR/EIS projection of 74.1 dBA CNEL, confirming the reasonableness of the model inputs. New residential construction in California typically achieves 30 dBA of exterior-to-interior attenuation with windows closed (Harris Miller Miller & Hanson 2006), which would reduce exterior levels of 74–75 dBA CNEL to approximately 45 dBA CNEL within interior spaces. In addition, the Project includes a decorative soundwall between Prairie City Road and the nearest proposed residential units. Based on FHWA (2006) guidance, this wall is expected to provide an additional 8 dBA reduction in exterior levels. When this Project design feature is considered, interior noise levels would be reduced to approximately 37 dBA CNEL, which is well below the 45 dBA CNEL significance criterion.

However, these predicted traffic noise levels do not account for quarry truck traffic. According to the FPASP EIR/EIS, the three quarries generating truck traffic traversing the FPASP contribute 12,662 daily truck trips under cumulative conditions. Because the primary uncertainty in the cumulative noise environment is the contribution from quarry truck traffic, a conservative calculation was conducted assuming the entire volume of quarry truck trips reported in the FPASP EIR/EIS, 12,662 daily trucks, would travel on Prairie City Road. Under this extremely conservative assumption, trucks would represent roughly half of all cumulative traffic and would generate an exterior level of 82.5 dBA CNEL at 50 feet (FHWA roadway noise prediction model). Applying the 8 dBA reduction from the soundwall and the 30 dBA exterior-to-interior attenuation for new residential construction results in predicted interior noise levels of approximately 44.5 dBA CNEL (82.5 dBA – 8 dBA – 30 dBA = 44.5).

Even under this highly conservative scenario, one that overstates truck traffic on Prairie City Road, interior noise levels would remain below the FPASP threshold of 45 dBA CNEL. Accordingly, proposed residential uses on the Project Site would not be exposed to interior noise levels exceeding 45 dBA CNEL from roadway or quarry truck traffic, and the Project is consistent with FPASP EIR/EIS Cumulative Mitigation Measure NOISE-1.

3.13.3.7 Groundborne Vibration Analysis

The Alder Creek Property development consists of the construction of 1,424 single family dwelling units with varying density as well as land uses such as private recreation, parks, landscaping, open space, roadways, and a fire station as a part of the developing FPASP. Operations at proposed residential units and the fire station would not include the use of any large-scale stationary equipment that would result in excessive vibration levels. Therefore, the Alder Creek Property development would not result in groundborne vibration impacts during operations.

Excessive groundborne vibration impacts result from continuously occurring vibration levels. Increases in groundborne vibration levels attributable to the Alder Creek Property development would be primarily

associated with short-term construction-related activities. Construction would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance.

Construction activities that generate excessive vibration, such as blasting, would not be expected to occur from future development due to the topography of the area, which is relatively flat and devoid of rock outcroppings. The FPASP EIR/EIS addressed the use of blasting but predicted it would only occur on the eastern portion of the Specific Plan Area, in El Dorado Hills, which is outside the boundary of the Alder Creek Property development. Most construction equipment would be mobile and dispersed across the site, rather than concentrated in a single area. Since detailed site plans are not yet finalized, it is assumed that construction activities could occur within 50 feet of sensitive structures.

The primary vibration-generating activities would occur during grading, placement of underground utilities, and construction of foundations. Table 3.13-3 shows the typical vibration levels produced by construction equipment at 50 feet.

Table 3.13-3. Representative Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity at 50 Feet (inches per second)	Vibration Level Vibration Velocity at 50 Feet (VdB)
Pile Driver (Impact)	0.225	95
Pile Driver (Sonic)	0.059	84
Vibratory Roller	0.073	85
Hoe Ram	0.031	78
Large Bulldozer	0.031	78
Caisson Drilling	0.031	78
Loaded Trucks	0.026	77
Jackhammer	0.012	70
Small Bulldozer	0.001	49

Note: VdB = vibration decibels
Source: California Department of Transportation (Caltrans) 2020

The City's vibration threshold requires construction projects and new developments anticipated to generate a significant amount of vibration to ensure acceptable interior vibration levels at nearby noise-sensitive uses using the following standards presented below in Table 3.13-4. The City's standards are based on criteria from the Federal Transit Administration's recommendations.

Table 4.13-4. Groundborne Vibration Impact Criteria for General Assessment

Land use Category	Impact Levels (VdB)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations	654	654	654
Category 2: Residences and buildings where people normally sleep	72	75	80
Category 3: Institutional land uses with primarily daytime uses	75	78	83

Notes: Vibration levels are measured in or near the vibration-sensitive use.
[1] "Frequent Events" is defined as more than 70 vibration events of the same source per day
[2] "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day
[3] "Infrequent Events" is defined as fewer than 30 vibration events of the same source per day
[4] This criterion limit is based on levels that are acceptable for most moderately-sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels.
Source: City of Folsom General Plan Chapter 9 Safety and Noise (2021).

Due to the nature of the Alder Creek Property development, the impact levels for *frequent events* will be used to evaluate its construction. It is noted that this can be classified as *frequent* because although the construction is temporary, the construction's vibrational impacts would be consistent and frequent throughout the construction period. With a Category 2 and *frequent events* classification, the impact events cannot exceed 72 VdB without exceeding the significance threshold. As indicated in Table 4.13-4, several types of equipment, including pile drives and vibratory rollers, can exceed the 72 VdB threshold at 50 feet. While actual distances may vary depending on future site design, the potential exists for construction activities to expose nearby receptors to vibration levels above the City's threshold. The FPASP EIR/EIS, certified by the City Council on June 14, 2011, includes an MMRP to address vibration impacts on nearby sensitive receptors. The Alder Creek Subdivision Site is located within the FPASP and is thus subject to the vibration–reducing mitigation measures contained in the Specific Plan EIR/EIS, specifically Mitigation Measure 3A.11-3 (see Appendix A).

The FPASP EIR/EIS explained that the nearest sensitive receptors (e.g., existing off-site El Dorado residences to the east of the steep hillside area where blasting could occur and planned on-site receptors) could be located within the distances modeled above that correspond to the exceedance levels recommended by Caltrans and the Federal Transit Administration (FTA). The Alder Creek Property development is consistent with the types, intensity, and patterns of land use evaluated by the FPASP EIR/EIS. Therefore, since the Alder Creek Property development is consistent with the land uses analyzed under the FPASP EIR/EIS, construction vibration impacts would be the same as analyzed in the EIR/EIS and there would not be an increase in the severity of impacts as a result of the Alder Creek Property development. There would not be a new or substantially more severe significant impact compared with the significance determination contained in the EIR/EIS.

3.13.3.8 Airport Noise Analysis

The development site is located approximately 8.94 miles northeast of the Sacramento Mather Airport. The site is located within the review area identified in the Mather Airport Land Use Compatibility Plan; however, it is not within the 60 dBA noise contour for the airport (Environmental Science Associates 2022). Implementation of the Alder Creek Property development would not affect airport operations, nor result in increased exposure of those on the development site to aircraft noise. There is not a new or substantially more severe significant impact compared with the significance determination contained in the FPASP EIR/EIS for airport noise impacts associated with the Alder Creek Property development.

3.13.4 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.
7. The FPASP EIR/EIS included 10 mitigation measures (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to noise that the proposed Project would have to adhere to.

3.14 Population and Housing

3.14.1 Environmental Setting

The Project site is located in the Folsom Plan Area within the City of Folsom. As such, land use in the area is governed by the City of Folsom General Plan 2035, FPASP, Zoning Ordinance, and related adopted plans. The FPASP EIR/EIS assessed population and housing impacts. The FPASP EIR/EIS concluded that the growth would not exceed anticipated forecast and impacts to housing, population, and employment would be less than significant.

3.14.2 FPASP EIR/EIS Summary

According to the FPASP EIR/EIS, impacts associated with population growth and housing demand are considered less than significant.

3.14.3 Population and Housing Conformity Analysis

3.14.3.1 Population and Housing Impacts

The Proposed Project is consistent with the General Plan and FPASP and would not induce unplanned growth. Implementation of the proposed Project would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively.

3.14.4 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.
7. The conclusion of the FPASP EIR/EIS relating to population and housing found all impacts to be less than significant. There are no mitigation measures contained in the FPASP EIR/EIS that apply to impacts to population and housing.

3.15 Public Services

3.15.1 Environmental Setting

3.15.1.1 Police Services

The City of Folsom Police Department is headquartered 46 Natoma Street. A substation is proposed to serve the Folsom Plan Area in the FPASP, tentatively planned to be located on the corner of East Bidwell Street and Old Ranch Way. The City monitors service ratios per the requirements of the General Plan and will add the substation as necessitated by Folsom Plan Area buildout.

3.15.1.2 Fire Services

The City of Folsom Fire Department operates five stations and serves the City of Folsom. Station 37, located at 70 Clarksville Road, is nearest the Project site. Future Station 34 is proposed to serve the Folsom Plan Area and is tentatively planned to be located on the corner of East Bidwell Street and Old Ranch Way. The City monitors service ratios per the requirements of the General Plan and will add Station 34 as necessitated by Folsom Plan Area buildout.

3.15.1.3 Schools

Folsom Cordova Unified School District currently manages 34 schools ranging from transitional kindergarten through adult education and has jurisdiction over the Proposed Project.

3.15.2 FPASP EIR/EIS Summary

According to the FPASP EIR/EIS, with implementation of all listed mitigation measures, all impacts related to public services would be reduced to a less than significant level.

3.15.3 Public Services Conformity Analysis

3.15.3.1 Impacts to Public Services

As described in the FPASP EIR/EIS, with implementation of mitigation measures, the project would not result in substantial on-site adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts. The proposed Project would include the same development and uses as described in the FPASP EIR/EIS and therefore would not impact public facilities beyond what was identified in the Specific Plan FEIR. The Project includes 10 acres for a neighborhood public park, whereas the FPASP states that there would be 10.03 acres for a neighborhood public park. However, this change is minimal and would not result in impacts to parks. Therefore, the analysis under the FPASP EIR/EIS remains accurate with respect to the proposed project and impacts would be less than significant.

3.15.4 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.
7. The FPASP EIR/EIS included four mitigation measures (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to public services that the proposed Project would have to adhere to.

3.16 Recreation

3.16.1 Environmental Setting

Over 1,000 acres of the total Folsom Plan Area is being maintained as permanently protected open space to preserve sensitive habitat areas. This protected area includes thick stands of oak woodlands, Alder Creek and streams that flow into it, wetlands, ponds, and hillsides. A network of more than 30 miles of bike paths, trails and picnic areas are planned to wind through the Plan Area for residents to enjoy the area's natural setting, as well as to connect residents to shopping, transit, schools, parks, woodlands, the American River Parkway and beyond.

In addition to preserved open space, the Folsom Plan Area will have more than 130 acres of public parks, including two large community parks and smaller parks accessible to every neighborhood. Parks are important to defining a community's character by providing places for children to play and for friends and families to gather and socialize. Parks within the Plan Area are planned to be close to schools, within a half-mile from homes and connected by walking and bicycle paths.

3.16.2 FPASP EIR/EIS Summary

According to the FPASP EIR/EIS, with implementation of all listed mitigation measures, all impacts related to recreation and parks would be reduced to a less than significant level.

3.16.3 Recreation Conformity Analysis

3.16.3.1 Parkland Impacts

As mentioned above, the Project includes 10 acres for a neighborhood public park, whereas the FPASP states that there would be 10.03 acres for a neighborhood public park. According to the FPASP, Section 9.3 Park Land Dedication, General Plan Policy 35.12 and Municipal Code Section 16.32.040 sets the minimum standard for parks, open space and recreation facilities in the City of Folsom at five acres per thousand population (5-acres per 1,000 persons). The formula shown herein provides the basis for determining the required park acreage per dwelling type.

Government Code Section 66477 provided the City of Folsom the ability to create Municipal Code Section 16.32.040 that allows the city to require the dedication of land or impose a requirement for the payment of fees in lieu thereof, or a combination of both, for park or recreation purposes as a condition to the approval of a tentative map or parcel map. The FPASP proposes to satisfy the park land dedication requirement by dedication of land and the payment of in lieu fees. Therefore, impacts associated with park and recreation facilities with implementation of the proposed Project would be less than significant with the slight decrease of parkland proposed and incorporation of in lieu fees. The Project would be required to adhere to all mitigation and avoidance measures listed within the FPASP EIR/EIS.

3.16.4 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.
7. The FPASP EIR/EIS included one mitigation measure (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to recreation and parks that the proposed Project would have to adhere to.

3.17 Transportation

3.17.1 Environmental Setting

3.17.1.1 Public Transit Service

The City of Folsom provides local bus transit within the City. The Sacramento Regional Transit District (SacRT) operates bus and light-rail transit service in Sacramento County. SacRT service is provided from downtown Sacramento along the Folsom Blvd/U.S. 50 corridor to the Historic Folsom light-rail station.

3.17.1.2 Bicycle Facilities

The General Plan includes Class I bicycle paths, and Class II bicycle lanes for the Folsom Plan Area. Development of Project area bicycle and pedestrian facilities is ongoing, and bicycle lanes have been installed on portions of East Bidwell Street and Savannah Parkway. Curbs, gutters, and sidewalks that meet City standards will be provided on all roadways in the area.

3.17.1.3 Pedestrian Facilities

Sidewalks have been constructed along public streets in the developed portions of the Folsom Plan Area, including along Old Ranch Way, Alder Creek Parkway, Savannah Parkway, and East Bidwell Street within the Project area. Major intersections on East Bidwell Street have or will have crosswalks, and other nearby signalized intersections have pedestrian crossing hardware and signal phases.

3.17.1.4 Planned Improvements

The U.S. 50/Empire Ranch Road Interchange Project will create new freeway access at a location north of the Project site. This improvement is projected to be complete in 2030-2035.

3.17.2 FPASP EIR/EIS Traffic Summary

According to the FPASP EIR/EIS, implementation of the FPASP would result in significant impacts to numerous intersections and roadways. However, mitigation measures, including construction of roadway and intersection improvements, reduced all but five of these impacts to a less-than-significant level. Five impacts remained significant and unavoidable under the project plus cumulative scenario. Two intersection impacts, at Oak Avenue Parkway/East Bidwell Street and East Bidwell Street/Iron Point Road remained significant and unavoidable because it is contrary to City policy to construct 8-lane roadways, as would be required to fully mitigate the impact. Impacts to three roadway segments on eastbound U.S. 50, including the Zinfandel Drive to Sunrise Boulevard segment, the Rancho Cordova Parkway to Hazel Avenue segment, and the Folsom Boulevard to Prairie City Road segment, remained potentially significant and unavoidable. The mitigation measures included for these segments call for fair-share payments to support the construction of the Southeast Capitol Connector. However, based on available information, it could not be determined that the proposed Southeast Capitol Connector would reduce traffic volumes on U.S. 50 to an acceptable level of service, and therefore these impacts were considered significant and unavoidable in the EIR/EIS.

3.17.3 Transportation Conformity Analysis

3.17.3.1 Conflict with Plan or Ordinance

The Project roadways would be consistent with the analysis and proposed roadways included in the FPASP EIR/EIS. Therefore, the analysis under the FPASP EIR/EIS remains accurate with respect to the proposed project. The proposed Project includes construction of roads that would create an efficient and safe transportation system through the project site consistent with the City's General Plan goals and policies addressing the circulation system. Therefore, impacts would be less than significant.

3.17.3.2 Consistency with CEQA Guidelines 15064.3, subdivision (b).

CEQA Guidelines Section 15064.3 subdivision (b) addresses the criteria for analyzing transportation impacts and establishes Vehicle Miles Traveled as the metric most appropriate to measure transportation impacts in a CEQA document. The Office of Planning and Research (OPR) *Technical Advisory on Evaluating Transportation Impacts in CEQA* cites increased access to common goods and services, such as schools, as a potential way to reduce vehicle miles travelled (OPR 2018). The Proposed Project is consistent with the FPASP and supporting Final EIR/EIS, the General Plan, and is consistent with all land use designations applied to the site. Additionally, the Proposed Project would not increase the number of people residing in the area beyond anticipated in previous analysis. Thus, the Project would not contribute to an increase in population or housing growth beyond that currently anticipated and planned for in the FPASP.

3.17.3.3 Traffic Hazards

The proposed Project is consistent with the roadway analysis included in the FPASP EIR/EIS. The Project does not include any project elements that could potentially create a traffic hazard for motor vehicles, bicycles, or pedestrians due to a proposed, non-standard design feature. Therefore, impacts would be less than significant.

3.17.3.4 Emergency Access

The proposed Project would result in the same access and uses as analyzed in the FPASP EIR/EIS. As described in the FPASP EIR/EIS, the project's evacuation approach would be consistent with the City's and County's evacuation approach. The proposed Project would be consistent with the Specific Plan's guidelines and provide adequate emergency access throughout the project site. The Project is consistent with the roadway analysis included in the FPASP EIR/EIS and would provide adequate emergency access to the project site. The project site access, including road widths and connectivity, would be consistent with the City's roadway standards and all applicable requirements. Therefore, impacts would be less than significant.

3.17.3.5 Prairie City Road Improvements

The proposed road improvements to Prairie City Road were previously analyzed in the following planning documents: FPASP EIR/EIS, the South of Highway 50 Backbone Infrastructure IS/MND, and the Easton Project: Glenborough at Easton and Easton Place, and.

The South of Highway 50 Backbone Infrastructure Initial Study and Mitigated Negative Declaration (prepared and adopted by the City in 2014), tiered from the FPASP EIR/EIS in accordance with CEQA Guidelines section 15152. The project description for the IS/MND included a section on "Roadway Construction" explaining that the street system outlined in the FPASP would be constructed, including the regional connectors, major arterials, and some of the minor arterials. This work included rough grading, rail corridor crossings and installation of pavement, curbs, gutters, street lighting, sidewalks, landscaping and striping. Because the widening of Prairie City Road was expressly contemplated in the FPASP EIR, and then the Backbone Infrastructure IS/MND purported to provide project level impact analysis of all the planned roads in the FPASP area, the IS/MND provides the required lower-tier CEQA analysis of the required improvements to Prairie City Road adjacent to the Toll Brothers development. The Backbone Infrastructure IS/MND supported the subsequent environmental permits covering the FPASP infrastructure footprints

Additionally, the Easton Project: Glenborough at Easton and Easton Place, which is located within Sacramento County and borders the proposed Project, analyzed the impacts of expanding Prairie City Road and included mitigation measure TC-6a, which was to construct improvements to widen Prairie City Road to six lanes between U.S. 50 and White Rock Road (Sacramento County 2008).

As mentioned in Section 2.1.3 above, the Project would only be constructed within the confines of the existing CWA Section 404 permit boundaries. The findings of the certified EIR/EIS remain valid, and no new significant or more severe impacts were identified.

3.17.4 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.

6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.
7. The FPASP EIR/EIS included 59 mitigation measure (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to traffic that the proposed Project would have to adhere to.

3.18 Tribal Cultural Resources

Assembly Bill 52 (AB 52), codified in Public Resources Code Sections 21073, 21074, 21080.3.1, and 21080.3.2, requires lead agencies to consult with California Native American tribes that are traditionally and culturally affiliated with the project area if those tribes have requested notification of projects under CEQA).

The EIR/EIS for the FPASP was certified prior to July 1, 2015, the effective date of AB 52. As such, AB 52 does not retroactively apply to the certified EIR. The proposed Project analyzed in this conformity analysis does not introduce new significant impacts or substantially increase the severity of previously identified impacts related to tribal cultural resources. No new information of substantial importance has been identified regarding tribal cultural resources that would require revisions to the EIR/EIS.

3.19 Utilities and Service Systems

3.19.1 Environmental Setting

The Project site is currently graded and undeveloped. As such, the Project would require the installation of utilities and stormwater collection infrastructure. These facilities would be coordinated with the installation of backbone infrastructure being developed in support of the Folsom Ranch development and the proposed utilities would connect to the appropriate service providers. The Project would include the installation of sanitary sewer lines, domestic water lines, fire lines, and storm drain utilities. All utility installation would be below ground in utility trenches. Water and sewer services will be provided by the City of Folsom.

3.19.1.1 Water

Water service to the site is provided by the City of Folsom, which obtains all of its potable water supply from Folsom Lake. The City's current water rights amount to 34,000 acre-feet of raw water per year. Water is treated at the City treatment plant, which has a capacity of 50 million gallons per day (mgd).

3.19.1.2 Wastewater

The City of Folsom will provide wastewater/sewage collection services to the site. All wastewater in the City of Folsom is treated by the Sacramento County Regional Sanitation District at the regional treatment facility located in Elk Grove, the Sacramento Regional Wastewater Treatment Plant (SRWTP). The current capacity of the treatment system is not expected to be reached until after 2030 with regional growth in the area. The SRWTP serves approximately 1.61 million people (Central Valley RWQCB 2021).

In May 2021, the Central Valley RWQCB issued a new discharge permit for Sacramento Regional County Sanitation District (SRCSD). The 2016 National Pollutant Discharge Elimination System (NPDES) discharge permit largely continued the requirements from the prior 2010 NPDES discharge permit (Permit No. CA0077682). The 2010 discharge permit required the Sacramento region to move to an advanced, or *tertiary*, treatment process (known as the EchoWater Project). SRCSD is now in the process of constructing significant new treatment processes to at the SRWTP to (1) remove ammonia and nitrates and (2) add filtration and enhanced disinfection to inactivate pathogens. This new system produces cleaner water for discharge into the Sacramento River, as well as for potential reuse as recycled water (e.g., for landscape and agricultural irrigation). Under the 2021 NPDES discharge permit, the average dry weather flows cannot exceed 181 mgd (Central Valley RWQCB 2021).

3.19.1.3 Stormwater

The City of Folsom Department of Public Works is responsible for stormwater management in the City. The City operates and maintains an extensive storm drainage system, including about 200 miles of pipe, 23 miles of natural drainage channels/creeks, 60 flood control and/or water quality detention basins, and over 200 outfalls to creeks/rivers. The City is active in the Sacramento Stormwater Quality Partnership designed to reduce and manage run-off throughout the area. The City also holds and complies with a National Pollutant Discharge Elimination System (NPDES) permit for commercial projects (including schools) that create one acre or more of impervious surface and residential projects 20 acres and larger.

The Project site will be served by a stormwater collection system, utilizing storm drains and central retention basins for the surrounding community. All stormwater collected from the Project site will run to these retention basins, with the most likely recipient being a basin located on the southern end of Timberline Meadow Way, approximately 650 feet south of the southeastern corner of the Project site. The Project site's new storm drain system would connect to the existing stormwater collection infrastructure through an easement directly south of the Project site.

3.19.1.4 Solid Waste

Solid waste and recycling materials are collected by the City of Folsom Solid Waste Division. Most refuse from Folsom is sent to Keifer Landfill, a Class III landfill located at 12701 Kiefer Boulevard in Sloughhouse, about 11 miles south of Highway 50. The landfill is permitted to receive a maximum of 10,815 tons per day and as of 2005 it had remaining capacity of 112,900,000 cubic yards, with an estimated closure in the year 2064. However, solid waste at school sites are handled under contract by Allied Waste, a private hauler, for the Folsom Cordova Unified School District and the Folsom Prison; Allied takes materials to the Forward Landfill in Stockton.

3.19.1.5 FPASP EIR/EIS Summary

According to the FPASP EIR/EIS, impacts associated with increased demand for SRCSD off-site wastewater collection and conveyance facilities; increased temporary and short-term and long-term generation of solid waste; and increased demands for electrical, natural gas, and communications service and infrastructure were considered less than significant. Implementation of mitigation measures contained in

the FPASP EIR/EIS were found to reduce impacts associated with increased demand for on-site wastewater collection and conveyance facilities and the off-site force main to a less than significant level.

In addition, FPASP implementation would increase demand for SRWTP facilities and would contribute to the need to expand the SRWTP; therefore, the FPASP would contribute indirectly to one significant and unavoidable impact (related to air quality) identified in the 2020 Master Plan EIR. Therefore, a residual significant and unavoidable impact would occur.

3.19.2 Utilities and Service Systems Conformity Analysis

The Project is part of the greater implementation of the FPASP. The Project would affect the same area analyzed for development in the FPASP EIR/EIS and would not alter the development type or density at the Project site.

As mentioned above, the proposed 69-kilovolt (kV) transmission lines will be realigned to the western side of Prairie City Road adjacent to the proposed improvements, to allow for the expanding of Prairie City Road. This change was not explicitly stated within the FPASP EIR/EIS; however, the line relocation work would occur in the area along Prairie City Road already cleared for permitting in the Backbone Infrastructure IS/MND, and the type and extent of grading, construction, and operation would be consistent with the activities already studied and approved for that area. This modification would not result in new or worse impacts that were not previously discussed in the FPASP EIR/EIS. Therefore, the impacts to public utilities would not change, and the findings of the certified EIR/EIS remain valid and no further analysis is required. No new impact would occur.

3.19.3 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.
3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.

7. The FPASP EIR/EIS included 12 mitigation measures (as seen in Appendix A, FPASP EIR/EIS Mitigation Monitoring and Reporting Program) to address impacts to utilities that the proposed Project would have to adhere to.

3.20 Wildfire

3.20.1 Environmental Setting

Generally, California fire season extends from spring to late fall. Fire conditions arise from a combination of hot weather, an accumulation of vegetation, and low moisture content in the air. These conditions, when combined with high winds and years of drought, increase the potential for wildfire to occur. California Department of Forestry and Fire Protection (CAL FIRE) provides wildland fire protection services on private, non-federal lands for the purpose of life, property, and resource protection. U.S. Forest Service and Bureau of Land Management provide wildland fire protection services on federal lands in Federal Responsibility Areas for watershed and resource protection. Some areas are also identified as Local Responsibility Areas.

The Project site is within a Local Responsibility Area and is served by the Folsom Fire Department. CAL FIRE classifies the Folsom Plan Area as a moderate Fire Hazard Severity Zone.

3.20.1.1 FPASP EIR/EIS Summary

According to the FPASP EIR/EIS, the FPASP is located within a state responsibility area designated as a moderate fire hazard severity zone. It was determined to not be near an area of high or extremely high fire hazard severity. Therefore, the FPASP EIR/EIS found that implementation would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas and it was not discussed further within the EIR/EIS.

3.20.2 Wildfire Conformity Analysis

As mentioned above, the FPASP EIR/EIS dismissed any impacts regarding wildfires as less than significant. The Project is part of the greater implementation of the FPASP. The Project would affect the same area analyzed for development in the FPASP EIR/EIS and would not alter the development type or density at the Project site. Therefore, the impacts to wildfires would not change, and the findings of the certified EIR/EIS remain valid and no further analysis is required. No new impact would occur.

3.20.3 Conclusion

The proposed project is consistent with the development evaluated in the FPASP EIR/EIS and would not result in any new impacts or increase the severity of any previously identified impacts as compared to what was already identified and disclosed, either individually or cumulatively. Further environmental analysis is not required because:

1. No substantial changes are proposed which result in new or worse effects.
2. There are no changes in circumstances surrounding the project that create new or worse effects.

3. There is no new information that results in significant effects that are not discussed in the Specific Plan FEIR.
4. There is no new information that results in new or worse effects than discussed in the Specific Plan FEIR.
5. There is no new information that results in mitigation measures that were previously found not to be feasible in the Specific Plan FEIR, to now be feasible.
6. There is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR.

The conclusion of the FPASP EIR/EIS relating to wildfire found all impacts to be less than significant. There are no mitigation measures contained in the FPASP EIR/EIS that apply to impacts to wildfire.

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5.0 REFERENCES

California Air Pollution Control Officers Association. 2022. California Emissions Estimator Model (CalEEMod), version 2022.1.

CARB (California Air Resources Board). 2023. State Area Designation Maps. http://www.arb.ca.gov/desig/adm/adm.htm.

_____. 2023. Federal Area Designation Maps. http://www.arb.ca.gov/desig/adm/adm.htm.

_____. 2021. 2021 Sacramento County Second 10-Year PM10 Maintenance Plan.

_____. 2018. 2018 Updates to the California State Implementation Plan.

_____. 2013. 2013 Update to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan.

_____. 2010. 2010 Sacramento County PM10 Implementation/Maintenance Plan and Re-Designation Request.

California Department of Conservation. 2022. California Important Farmland Finder. https://maps.conservation.ca.gov/DLRP/CIFF/. Accessed July 3, 2025.

_____. 2018. *Special Report 245 – Mineral Land Classification: Concrete Aggregate in the Greater Sacramento Area Production-Consumption Region*.

_____. 2015. Fault Activity Map of California. https://maps.conservation.ca.gov/cgs/fam/. Accessed July 3, 2025.

_____. 2014. *City of Folsom General Plan Update Existing Conditions Report*. https://www.folsom.ca.us/home/showdocument?id=228. Accessed January 2023.

California Department of Toxic Substances Control (DTSC). 2025. EnviroStor. https://www.envirostor.dtsc.ca.gov/public/map/. Accessed July 2025.

California Department of Transportation (Caltrans). 2020. *Transportation and Construction Vibration Guidance Manual*.

_____. 2013. *Technical Noise Supplement to the Traffic Noise Analysis Protocol*.

_____. 2002. California Airport Land Use Planning Handbook

California Department of Water Resources. 2020. California's Groundwater (Bulletin 118).

California Office of Planning and Research (OPR). 2018. *Technical Advisory on Evaluating Transportation Impacts in CEQA*.

Central Valley Regional Water Quality Control Board (RWQCB). 2021. Waste Discharge Requirements for the Sacramento Regional County Sanitation District Sacramento Regional Wastewater Treatment Plant. NPDES CA0077682 ORDER R5-2021-0019.

City of Folsom. 2024a. *General Plan Amendment EIR*. August

_____. 2024b. *2035 General Plan Amendment*. August

_____. 2021. *City of Folsom General Plan – Chapter 9 Safety and Noise*.

_____. 2011. *Folsom Plan Area Specific Plan Environmental Impact Report/Environmental Impact Statement*. June

ECORP Consulting, Inc. (ECORP) 2025a. *Alder Creek Property Project Emissions Report*.

_____. 2025b. *Alder Creek Property Roadway Construction Noise Model*. July.

_____. 2025c. *Alder Creek Property Project Traffic Noise Levels*. July.

_____. 2025d. *Paleontological Assessment Memorandum for the Alder Creek Property Project, Sacramento County, California*. July.

_____. 2025e. *Biological Resources Assessment for the Alder Creek Project*. July. Draft

_____. 2024. *Cultural Resources Due Diligence for the Proposed Toll Brothers Alder Creek Project Within the Folsom Plan Area Specific Plan*.

Environmental Science Associates. 2022. *Mather Airport Land Use Compatibility Plan*. https://www.sacog.org/home/showpublisheddocument/2728/638715078803870000

Federal Highway Administration. 2017a. *Construction Noise Handbook*. https://www.fhwa.dot.gov/Environment/noise/construction_noise/handbook/handbook02.cfm. Accessed May 12, 2025.

_____. 2017b. *Noise Barriers: Technical Considerations and Barrier Effectiveness*. https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide05.cfm#:~:text=Effective%20noise%20barriers%20can%20reduce%20noise%20levels%20by,%28usually%20called%20earthberms%29%20or%20from%20high%2C%20vertical%20walls. Accessed May 7, 2025.

_____. 2011.

_____. 2006. *Roadway Construction Noise Model*.

Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment*.

Folsom, City of. 2024a. Folsom Municipal Code. https://www.codepublishing.com/CA/Folsom/#!/html/Folsom08/Folsom0842.html024b.

_____. 2024b. 2035 *General Plan Amendment Environmental Impact Report Appendix C: Noise*. https://www.folsom.ca.us/home/showpublisheddocument/17104/638491219530530000

____. 2018. *Amended 2021. Folsom General Plan 2035*. https://www.folsom.ca.us/home/showdocument?id=18784&t=638630306939444676

2017. 2017 Traffic County Map. https://www.folsom.ca.us/government/public-works/traffic

_____. 2011. *Folsom Plan Area Specific Plan Public Draft EIR/EIS*. https://www.folsom.ca.us/home/showpublisheddocument/1694/637477103202830000.

Harris Miller, Miller & Hanson Inc. 2006. *Transit Noise and Vibration Impact Assessment, Final Report*.

Raney 2014. 2014. Fol*som Plan Area Specific Plan Backbone Infrastructure Initial Study/Mitigated Negative Declaration*. MONTH.

Sacramento, County of. 2011. Stoneridge Quarry General Plan Amendment, Rezone, Use Permit, Reclamation Plan and Development Agreement Final Environmental Impact Report.

Sacramento County. 2008. Easton Project: Easton Place and Glenborough at Easton Mitigation Monitoring and Reporting Program. November 2008.

_____. 2010. Teichert Quarry General Plan Amendment, Rezone, Use Permit, Reclamation Plan, Grading Permit, Encroachment Permit, and Development Agreement Final Environmental Impact Report.

Sacramento Metropolitan Air Quality Management District. (SMAQMD). 2024. *2021 Sacramento County Second 10-Year PM10 Maintenance Plan*.

_____. 2018. 2017 *Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan.*

_____. 2013. *$PM_{2.5}$ Implementation/Maintenance Plan and Re-designation Request for Sacramento $PM_{2.5}$ Nonattainment Area.*

_____. 2011. Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways.

_____. 2010. *PM_{10} Implementation/Maintenance Plan and Re-Designation Request*.

State Water Resources Control Board (SWRCB). 2025. GeoTracker. https://geotracker.waterboards.ca.gov/map/?global_id=T0600700017. Accessed July 8, 2025.

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LIST OF APPENDICES

Appendix A – Folsom Plan Area Specific Plan EIR/EIS Mitigation Monitoring and Reporting Program. City of Folsom. 2011.

Appendix B – *Alder Creek Property Project Emissions Report*. ECORP Consulting, Inc. July 2025.

Appendix C – *Alder Creek Property Project Roadway Construction*. ECORP Consulting, Inc. July 2025.

Appendix D – Alder Creek Property Project *Traffic Noise Levels*. ECORP Consulting, Inc. July 2025.

Appendix E – *Prairie City Road Phase 1 Improvements and Interim Connections*. MacKay & Somps. August 2025.

APPENDIX A

Folsom Plan Area Specific Plan EIR/EIS
Mitigation Monitoring and Reporting Program

City of Folsom 2011.

ATTACHMENT 1B

Mitigation Monitoring and Reporting Program

Folsom South of U.S. Highway 50 Specific Plan Project

SCH #2008092051

CITY OF FOLSOM
DISTINCTIVE BY NATURE

Prepared by:

AECOM

May 2011

Mitigation Monitoring and Reporting Program

Folsom South of U.S. Highway 50 Specific Plan Project

Prepared for:

City of Folsom
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Folsom, CA 95630

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May 2011

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MITIGATION MONITORING AND REPORTING PROGRAM

INTRODUCTION

In accordance with the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.) and the State CEQA Guidelines (14 California Code of Regulations [CCR] Section 15000 et seq.), the City of Folsom (City) and the U.S. Army Corps of Engineers (USACE) prepared an Environmental Impact Report / Environmental Impact Statement (EIR/EIS) that identifies adverse environmental impacts related to construction and operation of the Folsom South of U.S. Highway 50 Specific Plan Project. The EIR/EIS also identifies mitigation measures that would reduce these impacts to a less-than-significant level, or eliminate the adverse impacts altogether.

CEQA Guidelines require public agencies "to adopt a reporting and monitoring program for changes to the project which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment." A Mitigation Monitoring and Reporting Program (MMRP) is required for the proposed project because the EIR identifies potentially significant adverse impacts related to project implementation, and mitigation measures have been identified to reduce those impacts. Adoption of the MMRP would occur along with approval of the proposed project.

PURPOSE OF MITIGATION MONITORING AND REPORTING PROGRAM

This MMRP has been prepared to ensure that all required mitigation measures are implemented and completed in a satisfactory manner before and during project construction and operation. The MMRP may be modified by the City during project implementation, as necessary, in response to changing conditions or other refinements. Table 1 (included at the end of this document) has been prepared to assist the responsible parties in implementing the mitigation measures. The table identifies individual mitigation measures, monitoring/mitigation timing, responsible person/agency for implementing the measure, monitoring and reporting procedure, and space to confirm implementation of the mitigation measures. The numbering of mitigation measures follows the numbering sequence found in the EIR/EIS.

ROLES AND RESPONSIBILITIES

Unless otherwise specified herein, the City is responsible for taking all actions necessary to implement the mitigation measures under its jurisdiction according to the specifications provided for each measure and for demonstrating that the action has been successfully completed. The City, at its discretion, may delegate implementation responsibility or portions thereof to a licensed contractor or other designated agent. Areas in grey shading indicate that enforcement is required by an agency other than the City, and therefore no verification is required.

The City would be responsible for overall administration of the MMRP and for verifying that City staff members and/or the construction contractor has completed the necessary actions for each measure. The City would designate a project manager to oversee implementation of the MMRP. Duties of the project manager include the following:

- Ensure that routine inspections of the construction site are conducted by appropriate City staff; check plans, reports, and other documents required by the MMRP; and conduct report activities.
- Serve as a liaison between the City and the contractor or project applicant regarding mitigation monitoring issues.
- Complete forms and maintain reports and other records and documents generated by the MMRP.
- Coordinate and ensure that corrective actions or enforcement measures are taken, if necessary.

The responsible party for implementation of each item would identify the staff members responsible for coordinating with the City on the MMRP.

REPORTING

The City's project manager shall prepare a monitoring report, upon completion of the project, on the compliance of the activity with the required mitigation measures. Information regarding inspections and other requirements shall be compiled and explained in the report. The report shall be designed to simply and clearly identify whether mitigation measures have been adequately implemented. At a minimum, each report shall identify the mitigation measures or conditions to be monitored for implementation, whether compliance with the mitigation measures or conditions has occurred, the procedures used to assess compliance, and whether further action is required. The monitoring report shall be presented to the City Council.

MITIGATION MONITORING AND REPORTING PLAN TABLE

The categories identified in Table 1 are described below.

- **Mitigation Measure** – This column provides the text of the mitigation measures identified in the EIR.
- **Timing** – This column identifies the time frame in which the mitigation will take place.
- **Enforcement** – This column identifies the party responsible for enforcing compliance with the requirements of the mitigation measure.
- **Dated Signature for Verification of Compliance** – This column is to be dated and signed by the person (either project manager or his/her designee) responsible for verifying compliance with the requirements of the mitigation measure. Areas in grey shading do not require verification.

Table 1
Mitigation Monitoring and Reporting Plan for the Folsom South of U.S. Highway 50 Specific Plan Project

Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
3A.1 AESTHETICS - LAND				
Mitigation Measure 3A.1-1: Construct and Maintain a Landscape Corridor Adjacent to U.S. 50. The project applicant(s) for any particular discretionary development application adjacent to U.S. 50 shall fund, construct, and maintain a landscaped corridor within the SPA, south of U.S. 50. This corridor shall be 50 feet wide, except that the landscaped corridor width shall be reduced to 25 feet adjacent to the proposed regional mall. Landscaping plans and specifications shall be approved by Caltrans and the City of Folsom, and constructed by the project applicant(s) before the start of earthmoving activities associated with residential or commercial units. Landscaped areas would not be required within the preserved oak woodlands. As practicable, landscaping shall primarily contain native and/or drought tolerant plants. Landscaped corridors shall be maintained in perpetuity to the satisfaction of the City of Folsom.	1. Plans and specifications: before approval of grading plans and building permits 2. Construction: before the approval of occupancy permits associated with residential and commercial units 3. Maintenance: in perpetuity	Project applicant(s) for any particular discretionary development application adjacent to U.S. 50.	City of Folsom Community Development Department	
Mitigation Measure 3A.1-4: Screen Construction Staging Areas. The project applicant(s) for any particular discretionary development application shall locate staging and material storage areas as far away from sensitive biological resources and sensitive land uses (e.g., residential areas, schools, parks) as feasible. Staging and material storage areas shall be approved by the appropriate agency (identified below) before the approval of grading plans for all project phases and shall be screened from adjacent occupied land uses in earlier development phases to the maximum extent practicable. Screens may include, but are not limited to, the use of such visual barriers such as berms or fences. The screen design shall be approved by the appropriate agency to further reduce visual effects to the extent possible. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries shall be developed by the project applicant(s) of each applicable project phase in consultation with the affected oversight agency(ies) (i.e., El Dorado and/or Sacramento Counties, and Caltrans) to reduce to the extent feasible the visual effects of construction activities on adjacent project land uses that have already been developed.	Before approval of grading plans and during construction for all project phases.	Project applicant(s) for any particular discretionary development application.	1. For those improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department. 2. For the two local roadway connections from Folsom Heights into El Dorado Hills: El Dorado County Community Services Department. 3. For the U.S. 50 interchange improvements: Caltrans.	
Mitigation Measure 3A.1-5: Establish and Require Conformance to Lighting Standards and Prepare and Implement a Lighting Plan. To reduce impacts associated with light and glare, the City shall: ► Establish standards for on-site outdoor lighting to reduce high-intensity nighttime lighting and glare as part of the Folsom Specific Plan design guidelines/standards. Consideration shall be given to design features, namely directional shielding for street lighting, parking lot lighting, and other substantial light sources, that would reduce effects of nighttime lighting. In addition, consideration shall be given to the use of automatic shutoffs or motion sensors for lighting features to further reduce excess nighttime light. ► Use shielded or screened public lighting fixtures to prevent the light from shining off of the surface intended to be illuminated. To reduce impacts associated with light and glare, the project applicant(s) of all project phases shall: ► Shield or screen lighting fixtures to direct the light downward and prevent light spill on adjacent properties. ► Flood and area lighting needed for construction activities, nighttime sporting activities, and/or security shall be screened or aimed no higher than 45 degrees above straight down (half-way between straight down and straight to the side) when the source is visible from any off-site residential property or public roadway. ► For public lighting in residential neighborhoods, prohibit the use of light fixtures that are of unusually high intensity or brightness (e.g., harsh mercury vapor, low-pressure sodium, or fluorescent bulbs) or that blink or flash. ► Use appropriate building materials (such as low-glare glass, low-glare building glaze or finish, neutral, earth-toned colored paint and roofing materials), shielded or screened lighting, and appropriate signage in the office/commercial areas to prevent light and glare from adversely affecting motorists on nearby roadways.	Before approval of building permits.	Project applicant(s) for any particular discretionary development application.	1. For all on-site and off-site facilities that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department. 2. For the off-site detention basin: Sacramento County Planning Department. 3. For the two local roadways off-site into El Dorado Hills: El Dorado County Community Services Department.	

Table 1
Mitigation Monitoring and Reporting Plan for the Folsom South of U.S. Highway 50 Specific Plan Project

Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
▸ Design exterior on-site lighting as an integral part of the building and landscape design in the Folsom Specific Plan area. Lighting fixtures shall be architecturally consistent with the overall site design. ▸ Lighting of off-site facilities within the City of Folsom shall be consistent with the City's General Plan standards. ▸ Lighting of the off-site detention basin shall be consistent with Sacramento County General Plan standards. ▸ Lighting of the two local roadway connections from Folsom Heights off-site into El Dorado Hills shall be consistent with El Dorado County General Plan standards. A lighting plan for all on- and off-site elements within the each agency's jurisdictional boundaries (specified below) shall be submitted to the relevant jurisdictional agency for review and approval, which shall include the above elements. The lighting plan may be submitted concurrently with other improvement plans, and shall be submitted before the installation of any lighting or the approval of building permits for each phase. The project applicant(s) for any particular discretionary development application shall implement the approved lighting plan. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., El Dorado and/or Sacramento Counties).				
3B.1 AESTHETICS - WATER				
Mitigation Measure 3B.1-2a: Enhance Exterior Appearance of Structural Facilities. The external appearance of above-ground facilities, including the choice of color and materials, shall seek to reduce the visual impact of the proposed WTP, pump station, and above-ground storage tank facilities. Bright reflective materials and colors shall be avoided. As appropriate, the exterior design of these facilities should follow design guidelines provided in applicable land use plans. Minimum exterior design requirements shall include, but are not limited to, the following: ▸ painting (with earth-colored tones) of structural façades to blend with surrounding land uses, ▸ use of fencing or structural materials similar to those used by nearby land uses, ▸ installation of berms and/or landscaping around the facility (see Mitigation Measure 3B.2-2b for additional detail), and ▸ clustering of structural facilities to maximize open space buffering.	Prior to approval of grading plans and building permits for WTP, pump stations, and storage tank facilities.	City of Folsom Utilities Department	1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department. 2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department. 3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.	
Mitigation Measure 3B.1-2b: Prepare Landscaping Plan. The City shall develop a landscaping plan for each structural facility site that uses a combination of native vegetation, earthen features (e.g., boulders), and, if appropriate, topographical separations (e.g., berms) to maximize site appearance and shield the new facilities from nearby sensitive receptors to the extent feasible. In addition to complying with local standards, the landscaping plan shall require the following at each site: ▸ Vegetation shall be arranged in a hierarchy of plant groupings to enhance the visual and scenic qualities of the site(s). To the extent practical, the design will minimize the need for supplemental irrigation. ▸ New or replacement vegetation shall be compatible with surrounding vegetation and shall be adaptable to the site with regard to rainfall, soil type, exposure, growth rate, erosion control, and energy conservation purposes. ▸ Plant materials chosen shall be species which do not present any safety hazards, which allow native flora to reestablish in the area, and which require minimal maintenance, including watering, pest control, and clean-up of litter from fruit and droppings.	Prior to approval of grading plans and building permits for WTP, pump stations, and storage tank facilities.	City of Folsom Utilities Department	1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department. 2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department.	

Table 1
Mitigation Monitoring and Reporting Plan for the Folsom South of U.S. Highway 50 Specific Plan Project

Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
			3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.	
Mitigation Measure 3B.1-3a: Conformance to Construction Lighting Standards. The City shall limit construction to daylight hours to the extent possible. If nighttime lighting or construction is necessary, the City shall ensure that unshielded lights, reflectors, or spotlights are not located and directed to shine toward or be directly visible from adjacent properties or streets. To the extent possible, the City shall minimize the use of nighttime construction lighting within 500 feet of existing residences. This measure shall be identified on grading plans and in construction contracts.	Prior to approval of grading plans and building permits for WTP, pump stations, and storage tank facilities.	City of Folsom Utilities Department	1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department. 2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department. 3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.	
Mitigation Measure 3B.1-3b: Prepare and Submit a Lighting Master Plan. The City shall prepare a Lighting Master Plan that covers all Off-site Water Facilities-related outdoor light sources. The Lighting Master Plan shall include the following minimum requirements: ► outdoor lighting shall be properly shielded and installed to prevent light trespass on adjacent properties; ► flood or spot lamps installed as part of the Off-site Water Facilities shall be aimed no higher than 45 degrees above straight down (half-way between straight down and straight to the side) when the source is visible from any off-site residential property or public roadway; ► prohibit the use of harsh mercury vapor, low-pressure sodium, or fluorescent bulbs for public lighting in residential neigbborhoods; and ► comply with requirements of local jurisdiction, if applicable.	Prior to approval of grading plans and building permits for WTP, pump stations, and storage tank facilities.	City of Folsom Utilities Department	1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department. 2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department. 3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.	
3A.2 AIR QUALITY - LAND				
Mitigation Measure 3A.2-1a: Implement Measures to Control Air Pollutant Emissions Generated by Construction of On-Site Elements. To reduce short-term construction emissions, the project applicant(s) for any particular discretionary development application shall require their contractors to implement SMAQMD's list of Basic Construction Emission Control Practices, Enhanced Fugitive PM Dust Control Practices, and Enhanced Exhaust Control Practices (list below) in effect at the time individual portions of the site undergo	Before the approval of all grading plans by the City and throughout project construction,	The project applicant(s) of all project phases.	City of Folsom Community Development Department	

Table 1
Mitigation Monitoring and Reporting Plan for the Folsom South of U.S. Highway 50 Specific Plan Project

Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
construction. In addition to SMAQMD-recommended measures, construction operations shall comply with all applicable SMAQMD rules and regulations. **Basic Construction Emission Control Practices** ▸ Water all exposed surfaces two times daily. Exposed surfaces include, but are not limited to soil piles, graded areas, unpaved parking areas, staging areas, and access roads. ▸ Cover or maintain at least two feet of free board space on haul trucks transporting soil, sand, or other loose material on the site. Any haul trucks that would be traveling along freeways or major roadways should be covered. ▸ Use wet power vacuum street sweepers to remove any visible trackout mud or dirt onto adjacent public roads at least once a day. Use of dry power sweeping is prohibited. ▸ Limit vehicle speeds on unpaved roads to 15 miles per hour (mph). ▸ All roadways, driveways, sidewalks, parking lots to be paved should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used. ▸ Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, Section 2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site. ▸ Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determine to be running in proper condition before it is operated. **Enhanced Fugitive PM Dust Control Practices – Soil Disturbance Areas** ▸ Water exposed soil with adequate frequency for continued moist soil. However, do not overwater to the extent that sediment flows off the site. ▸ Suspend excavation, grading, and/or demolition activity when wind speeds exceed 20 mph. ▸ Plant vegetative ground cover (fast-germinating native grass seed) in disturbed areas as soon as possible. Water appropriately until vegetation is established. **Enhanced Fugitive PM Dust Control Practices – Unpaved Roads** ▸ Install wheel washers for all exiting trucks, or wash off all trucks and equipment leaving the site. ▸ Treat site accesses to a distance of 100 feet from the paved road with a 6 to 12-inch layer of wood chips, mulch, or gravel to reduce generation of road dust and road dust carryout onto public roads. ▸ Post a publicly visible sign with the telephone number and person to contact at the construction site regarding dust complaints. This person shall respond and take corrective action within 48 hours. The phone number of SMAQMD and the City contact person shall also be posted to ensure compliance. **Enhanced Exhaust Control Practices** ▸ The project shall provide a plan, for approval by the City of Folsom Community Development Department and SMAQMD, demonstrating that the heavy-duty (50 horsepower [hp] or more) off-road vehicles to be used in the construction project, including owned, leased, and subcontractor vehicles, will achieve a project wide fleet-average 20% NO_X reduction and 45% particulate reduction compared to the most current California Air Resources Board (ARB) fleet average that exists at the time of construction. Acceptable options for reducing emissions may include use of late-model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available. The project applicant(s) of each project phase or its representative shall submit to the City of Folsom Community Development Department and SMAQMD a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 hp, that would be used an aggregate of 40 or more hours during any portion of the construction project. The inventory shall include the horsepower rating, engine production year, and projected hours of use for each piece of equipment. The inventory shall be updated and submitted monthly throughout the duration of the project, except that an inventory shall not be required for any 30-day period in which no construction activity occurs. At least 48 hours prior to the use of heavy-duty off-road equipment, the project representative shall provide SMAQMD with the anticipated construction timeline including start date, and name and phone number of the project manager and on-site foreman. SMAQMD's Construction Mitigation Calculator can be used to identify an equipment fleet that achieves this reduction (SMAQMD 2007a). The project shall ensure that emissions from all off-road diesel powered equipment used on the SPA do not exceed 40% opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately, and the City and SMAQMD shall be notified within 48 hours of identification of non-compliant equipment. A visual survey of all in-operation equipment shall be made at least weekly, and a monthly summary of the visual	where applicable, for all project phases.			

Table 1
Mitigation Monitoring and Reporting Plan for the Folsom South of U.S. Highway 50 Specific Plan Project

Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
survey results shall be submitted throughout the duration of the project, except that the monthly summary shall not be required for any 30-day period in which no construction activity occurs. The monthly summary shall include the quantity and type of vehicles surveyed as well as the dates of each survey. SMAQMD staff and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this mitigation measure shall supersede other SMAQMD or state rules or regulations. ► If at the time of construction, SMAQMD has adopted a regulation or new guidance applicable to construction emissions, compliance with the regulation or new guidance may completely or partially replace this mitigation if it is equal to or more effective than the mitigation contained herein, and if SMAQMD so permits.				
Mitigation Measure 3A.2-1b: Pay Off-site Mitigation Fee to SMAQMD to Off-Set NO_X Emissions Generated by Construction of On-Site Elements. Implementation of the Proposed Project or the other four other action alternatives would result in construction-generated NO_X emissions that exceed the SMAQMD threshold of significance, even after implementation of the SMAQMD Enhanced Exhaust Control Practices (listed in Mitigation Measure 3A.2-1a). Additionally, Mitigation Measure 3A.4-1 (Implement Additional Measures to Control Construction-Generated GHG Emissions, pages 3A.4-14 to 15) has the potential to both reduce and increase NO_X emissions, depending on the types of alternative fuels and engine types employed. Therefore, the project applicant(s) shall pay SMAQMD an off-site mitigation fee for implementation of any of the five action alternatives for the purpose of reducing NO_X emissions to a less-than-significant level (i.e., less than 85 lb/day). All NO_X emission reductions and increases associated with GHG mitigation shall be added to or subtracted from the amount above the construction threshold to determine off-site mitigation fees, when possible. The specific fee amounts shall be calculated when the daily construction emissions can be more accurately determined: that is, if the City/USACE select and certify the EIR/EIS and approves the Proposed Project or one of the other four other action alternatives, the City and the applicants must establish the phasing by which development would occur, and the applicants must develop a detailed construction schedule. Calculation of fees associated with each project development phase shall be conducted by the project applicant(s) in consultation with SMAQMD staff before the approval of grading plans by the City. The project applicant(s) for any particular discretionary development application shall pay into SMAQMD's off-site construction mitigation fund to further mitigate construction-generated emissions of NO_X that exceed SMAQMD's daily emission threshold of 85 lb/day. The calculation of daily NO_X emissions shall be based on the cost rate established by SMAQMD at the time the calculation and payment are made. At the time of writing this EIR/EIS the cost rate is $16,000 to reduce 1 ton of NO_X plus a 5% administrative fee (SMAQMD 2008c). The determination of the final mitigation fee shall be conducted in coordination with SMAQMD before any ground disturbance occurs for any project phase. Based on information available at the time of writing this EIR/EIS, and assuming that construction would be performed at a consistent rate over a 19-year period (and averaging of 22 work days per month), it is estimated that the off-site construction mitigation fees would range from $517,410 to $824,149, depending on which alternative is selected. Because the fee is based on the mass quantity of emissions that exceed SMAQMD's daily threshold of significance of 85 lb/day, total fees would be substantially greater if construction activity is more intense during some phases and less intense during other phases of the 19-year build out period, and in any event, based on the actual cost rate applied by SMAQMD. (This fee is used by SMAQMD to purchase off-site emissions reductions. Such purchases are made through SMAQMD's Heavy Duty Incentive Program, through which select owners of heavy-duty equipment in Sacramento County can repower or retrofit their old engines with cleaner engines or technologies.)	Before the approval of all grading plans by the City and throughout project construction for all project phases.	The project applicant(s) of all project phases.	The City of Folsom Community Development Department shall not grant any grading permits to the respective project applicant(s) until the respective project applicant(s) have paid the appropriate off-site mitigation fee to SMAQMD.	
Mitigation Measure 3A.2-1c: Analyze and Disclose Projected PM_{10} Emission Concentrations at Nearby Sensitive Receptors Resulting from Construction of On-Site Elements. Prior to construction of each discretionary development entitlement of on-site land uses, the project applicant shall perform a project-level CEQA analysis (e.g., supporting documentation for an exemption, negative declaration, or project-specific EIR) that includes detailed dispersion modeling of construction-generated PM_{10} to disclose what PM_{10} concentrations would be at nearby sensitive receptors. The dispersion modeling shall be performed in accordance with applicable SMAQMD guidance that is in place at the time the analysis is performed. At the time of writing this EIR/EIS, SMAQMD's most current and most detailed guidance for addressing construction-generated PM_{10} emissions is found in its Guide to Air Quality Assessment in Sacramento County (SMAQMD 2009a). The project-level analysis shall incorporate detailed parameters of the construction equipment and activities, including the year during which construction would be performed, as well as the proximity of potentially affected receptors, including receptors proposed by the project that exist at the time the construction activity would occur.	Before the approval of all grading plans by the City.	All detailed, project-level analysis shall be performed and funded by the project applicant(s) for each discretionary development entitlement. All feasible mitigation shall be also be funded by the project applicant(s).	City of Folsom Community Development Department	

Table 1
Mitigation Monitoring and Reporting Plan for the Folsom South of U.S. Highway 50 Specific Plan Project

Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
Mitigation Measure 3A.2-1d: Implement SMAQMD's Basic Construction Emission Control Practices during Construction of all Off-site Elements located in Sacramento County. The applicants responsible for the construction of each off-site element in Sacramento County shall require their contractors to implement SMAQMD's Basic Construction Emission Control Practices during construction. A list of SMAQMD's Basic Construction Emission Control Practices is provided under Mitigation Measure 3A.2-1a. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be developed by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., Sacramento County or Caltrans) to implement SMAQMD's Basic Construction Emission Control Practices or comparable feasible measures.	Before the approval of all grading plans from SMAQMD.	The project applicant(s) responsible for construction of each off-site element in Sacramento County.	1. For all off-site improvements within Sacramento County: Sacramento County Planning and Community Development Department. 2. For the U.S. 50 interchange improvements: Caltrans.	
Mitigation Measure 3A.2-1e: Implement EDCAQMD-Recommended Measures for Controlling Fugitive PM_{10} dust During Construction of the Two Roadway Connections in El Dorado County. Prior to construction of each roadway extension in El Dorado County, the applicants or its contractors shall develop a fugitive dust control plan that is approved by EDCAQMD and the applicants shall require their contractors to implement the dust control measures identified in the EDCAQMD-approved fugitive dust control plan. The fugitive dust control plan shall contain measures that are recommended by EDCAQMD at the time the plan is developed, which may include, but is not limited to, the current list of EDCAQMD-recommended dust control measures provided in Table 3A.2-5 below. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be developed by the project applicant(s) of each applicable project phase in consultation with the affected oversight agency(ies) (i.e., El Dorado County). **Table 3A.2-5** **EDCAQMD-Recommend Fugitive Dust Control Measures** Source: Table 4.12 of EDCAQMD's *Guide to Air Quality Assessment* (EDCAQMD 2002).	Before the approval of grading plans by EDCAQMD.	The project applicant(s) responsible for constructing the roadway connections in El Dorado County.	El Dorado County Development Services Department.	
Mitigation Measure 3A.2-1f: Implement SMAQMD's Enhanced Exhaust Control Practices during Construction of all Off-site Elements. Implement SMAQMD's Enhanced Exhaust Control Practices, which are listed in Mitigation Measure 3A.2-1a, in order to control NO_X emissions generated by construction of all off-site elements (in Sacramento and El Dorado Counties, or Caltrans right-of-way).	Before the approval of all grading plans from the respective air district (i.e., SMAQMD or EDCAQMD).	The project applicant(s) responsible for construction of each off-site element in Sacramento and El Dorado counties.	1. For the two roadway connections in El Dorado Hills: El Dorado County Development Services Department. 2. For the detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department. 3. For the U.S. 50 interchange improvements: Caltrans.	
Mitigation Measure 3A.2-1g: Pay Off-site Mitigation Fee to SMAQMD to Off-Set NO_X Emissions Generated by Construction of Off-site Elements. The off-site elements could result in construction-generated NO_X emissions that exceed the SMAQMD threshold of significance, even after implementation of the SMAQMD Enhanced Exhaust Control Practices (listed in Mitigation Measure 3A.2-1a). Therefore, the responsible project applicant(s) for each off-site element in Sacramento County shall pay SMAQMD an off-site mitigation fee for implementation of each off-site element in Sacramento County for the purpose of reducing NO_X emissions to a less-than-significant level (i.e., less than 85 lb/day). The specific fee amounts shall be calculated when the daily construction emissions can be more accurately determined. This calculation shall occur if the City/USACE certify the EIR/EIS and select and approves the Proposed Project or one of the	Before the approval of each grading plan for the off-site elements in Sacramento County.	The project applicant(s) of all off-site elements in Sacramento County.	1. For all off-site improvements within Sacramento County: Sacramento County Planning and Community Development Department shall not grant any grading	

Table 3A.2-5
EDCAQMD-Recommend Fugitive Dust Control Measures

Source	Mitigation Measure
Soil Piles	Enclose, cover, or water twice daily all soil piles
	Automatic sprinkler system installed on soil piles
Exposed Surface/Grading	Water all exposed soil twice daily
	Water exposed soil with adequate frequency to keep soil moist at all times
Truck Hauling Road	Water all haul roads twice daily
	Pave all haul roads
Truck Hauling Load	Maintain at least two feet of freeboard
	Cover load of all haul/dump trucks securely

Source: Table 4.12 of EDCAQMD's *Guide to Air Quality Assessment* (EDCAQMD 2002).

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
other four other action alternatives, the City, Sacramento County, and the applicants establish the phasing by which construction of the off-site elements would occur, and the applicants develop a detailed construction schedule. Calculation of fees associated with each off-site element shall be conducted by the project applicant(s) in consultation with SMAQMD staff before 'the approval of respective grading plans by Sacramento County. The project applicant(s) responsible for each off-site element in Sacramento County shall pay into SMAQMD's off-site construction mitigation fund to further mitigate construction-generated emissions of NO_X that exceed SMAQMD's daily emission threshold of 85 lb/day. The calculation of daily NO_X emissions shall be based on the cost rate established by SMAQMD at the time the calculation and payment are made. At the time of writing this EIR/EIS the cost rate is $16,000 to reduce 1 ton of NO_X plus a 5% administrative fee (SMAQMD 2008c). The determination of the final mitigation fee shall be conducted in coordination with SMAQMD before any ground disturbance occurs for any project phase. Because the fee is based on the mass quantity of emissions that exceed SMAQMD's daily threshold of significance of 85 lb/day, total fees for construction of the off-site elements would vary according to the timing and potential overlap of construction schedules for off-site elements. This measure applies only to those off-site elements located in SMAQMD's jurisdiction (i.e., in Sacramento County) because EDCAQMD does not offer a similar off-set fee program for construction-generated NO_X emissions in its jurisdiction. (This fee is used by SMAQMD to purchase off-site emissions reductions. Such purchases are made through SMAQMD's Heavy Duty Incentive Program, through which select owners of heavy-duty equipment in Sacramento County can repower or retrofit their old engines with cleaner engines or technologies.) Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be developed by the project applicant(s) of each applicable project phase in consultation with the affected oversight agency(ies) (i.e., Sacramento County or Caltrans).			permits to the respective project applicant(s) until the respective project applicant(s) have paid the appropriate off-site mitigation fee to SMAQMD. 2. For the U.S. 50 interchange improvements: Caltrans shall not grant any grading permits to the respective project applicant(s) until the respective project applicant(s) have paid the appropriate off-site mitigation fee to SMAQMD.	
Mitigation Measure 3A.2-1h: Analyze and Disclose Projected PM_{10} Emission Concentrations at Nearby Sensitive Receptors Resulting from Construction of Off-site Elements. Prior to construction of each off-site element located in Sacramento County that would involve site grading or earth disturbance activity that would exceed 15 acres in one day, the responsible agency or its selected consultant shall conduct detailed dispersion modeling of construction-generated PM_{10} emissions pursuant to SMAQMD guidance that is in place at the time the analysis is performed. At the time of writing this EIR/EIS, SMAQMD's most current and most detailed guidance for addressing construction-generated PM_{10} emissions is found in its Guide to Air Quality Assessment in Sacramento County SMAQMD 2009a). SMAQMD emphasizes that PM_{10} emission concentrations at nearby sensitive receptors be disclosed in project-level CEQA analysis. Each project-level analysis shall incorporate detailed parameters of the construction equipment and activities, including the year during which construction would be performed, as well as the proximity of potentially affected receptors, including receptors proposed by the project that exist at the time the construction activity would occur. If the modeling analysis determines that construction activity would result in an exceedance or substantial contribution to the CAAQS and NAAQS at a nearby receptor, then the project applicant(s) shall require their respective contractors to implement additional measures for controlling construction-generated PM_{10} exhaust emission and fugitive PM_{10} dust emissions in accordance with SMAQMD guidance, requirements, and/or rules that apply at the time the project-level analysis is performed. It is likely that these measures would be the same or similar to those listed as Enhanced Fugitive PM Dust Control Practices for Soil Disturbance Areas and Unpaved Roads and Enhanced Exhaust Control Practices included in Mitigation Measure 3A.2-1a. Dispersion modeling is not required for the two El Dorado County roadway connections because the total amount of disturbed acreage is expected to be less than the EDCAQMD screening level of 12 acres. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be developed by the project applicant(s) of each applicable project phase in consultation with the affected oversight agency(ies) (i.e., Sacramento County or Caltrans).	1. For all off-site improvements within unincorporated Sacramento County: Before the approval of the respective grading plans from the Sacramento County Planning and Community Development Department 2. For the U.S. 50 interchange improvements: Before the approval of construction plans from Caltrans.	All detailed, project-level analysis shall be performed by the responsible lead agency or its selected consultant and funded by the project applicant(s). Implementation of the project-level modeling analysis and any necessary additional mitigation shall be fully funded by the project applicant(s) responsible for each off-site improvement.	1. For all off-site improvements within Sacramento County: Sacramento County Planning and Community Development Department. 2. For the U.S. 50 interchange improvements: Caltrans.	
Mitigation Measure 3A.2-2: Implement All Measures Prescribed by the Air Quality Mitigation Plan to Reduce Operational Air Pollutant Emissions. To reduce operational emissions, the project applicant(s) for any particular discretionary development application shall implement all measures prescribed in the SMAQMD-approved *Folsom Plan Area Specific Plan Air Quality Mitigation Plan* (AQMP) (Torrence Planning 2008), a copy of which is included in Appendix C2. The AQMP is intended to improve mobility, reduce vehicle miles traveled, and improve air quality as required by AB 32 and SB 375. The AQMP includes, among others, measures designed to provide bicycle parking at commercial land uses, an integrated pedestrian/bicycle path network, transit stops with shelters, a prohibition against the use the wood-burning fireplaces, energy star roofing materials, electric lawnmowers provided to homeowners at no charge, and on-site transportation alternatives to passenger vehicles (including light rail) that provide connectivity with other local and regional alternative transportation networks.	Before issuance of subdivision maps or improvement plans.	The project applicant(s) any particular discretionary development application.	City of Folsom Community Development Department.	
Mitigation Measure 3A.2-4a: Develop and Implement a Plan to Reduce Exposure of Sensitive Receptors to Construction-Generated Toxic Air Contaminant Emissions. The project applicant(s) for any particular discretionary development application shall develop a plan to reduce the exposure of sensitive receptors to TACs generated by project construction activity associated with buildout of the selected alternative. Each plan shall be developed by the project applicant(s) in consultation with SMAQMD. The plan shall be submitted to the City	Before the approval of all grading plans by the City and throughout project construction,	The project applicant(s) any particular discretionary development	City of Folsom Community Development Department.	

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Mitigation Measure	Timing	Implementation	Enforcement	Daled Signature for Verification of Compliance
for review and approval before the approval of any grading plans. The plan may include such measures as scheduling activities when the residences are the least likely to be occupied, requiring equipment to be shut off when not in use, and prohibiting heavy trucks from idling. Applicable measures shall be included in all project plans and specifications for all project phases. The implementation and enforcement of all measures identified in each plan shall be funded by the project applicant(s) for the respective phase of development.	where applicable, for all project phases.	application.		
Mitigation Measure 3A.2-4b: Implement Measures to Reduce Exposure of Sensitive Receptors to Operational Emissions of Toxic Air Contaminants. The following measures shall be implemented to reduce exposure of sensitive receptors to Toxic Air Contaminants. ▸ Proposed commercial and industrial land uses that have the potential to emit TACs or host TAC-generating activity (e.g., loading docks) shall be located away from existing and proposed on-site sensitive receptors such that they do not expose sensitive receptors to TAC emissions that exceed an incremental increase of 10 in 1 million for the cancer risk and/or a noncarcinogenic Hazard Index of 1.0. ▸ The multi-family residences planned across from the off-site corporation yard near the southwest corner of the SPA shall be set back as far as possible from the boundary of the corporation yard and/or relocated to another area. ▸ Where necessary to reduce exposure of sensitive receptors to an incremental increase of 10 in 1 million for the cancer risk and/or a noncarcinogenic Hazard Index of 1.0, proposed commercial and industrial land uses that would host diesel trucks shall incorporate idle reduction strategies that reduce the main propulsion engine idling time through alternative technologies such as, IdleAire, electrification of truck parking, and alternative energy sources for TRUs, to allow diesel engines to be completely turned off. ▸ Signs shall be posted in at all loading docks and truck loading areas which indicate that diesel-powered delivery trucks must be shut off when not in use for longer than 5 minutes on the premises in order to reduce idling emissions. This measure is consistent with the ATCM to Limit Diesel-Fueled Commercial Motor Vehicle Idling, which was approved by the California Office of Administrative Law in January 2005. ▸ Implement the following additional guidelines, which are recommended in ARB's *Land Use Handbook: A Community Health Perspective* (ARB 2005) and are considered to be advisory and not regulatory: • Sensitive receptors, such as residential units and daycare centers, shall not be located in the same building as dry-cleaning operations that use perchloroethylene. Dry-cleaning operations that use perchloroethylene shall not be located within 300 feet of any sensitive receptor. A setback of 500 feet shall be provided for operations with two or more machines. • Large gasoline stations (defined as facilities with a throughput of 3.6 million gallons per year or greater) and sensitive land uses shall not be sited within 300 feet of each other. Small gasoline-dispensing facilities (less than 3.6 million gallons of throughput per year) and sensitive land uses shall not be sited within 50 feet of each other.	Before the approval of all grading plans by the SMAQMD and throughout project construction, where applicable, for all project phases.	The project applicant(s) of all project phases.	City of Folsom Community Development Department.	
Mitigation Measure 3A.2-5: Implement A Site Investigation to Determine the Presence of NOA and, if necessary, Prepare and Implement an Asbestos Dust Control Plan. A site investigation shall be performed to determine whether and where NOA is present in the soil and rock on the SPA. The site investigation shall include the collection of soil and rock samples by a qualified geologist. If the site investigation determines that NOA is present on the SPA then the project applicant shall prepare an Asbestos Dust Control Plan for approval by SMAQMD as required in Title 17, Section 93105 of the California Code of Regulations, "Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations." The Asbestos Dust Control Plan shall specify measures, such as periodic watering to reduce airborne dust and ceasing construction during high winds. Measures in the Asbestos Dust Control Plan may include but shall not be limited to dust control measures required by Mitigation Measure 3A.2-1a. The project applicant shall submit the plan to the Folsom Community Development Department for review and SMAQMD for review and approval before construction of the first project phase. SMAQMD approval of the plan must be received before any asbestos-containing rock (serpentinite) can be disturbed. Upon approval of the Asbestos Dust Control Plan by SMAQMD, the applicant shall ensure that construction contractors implement the terms of the plan throughout the construction period.	Before the approval of all grading plans by the City and throughout project construction, where applicable, for all project phases.	The project applicant(s) of all project phases.	City of Folsom Community Development Department.	
Mitigation Measure 3A.2-6: Implement Measures to Control Exposure of Sensitive Receptors to Operational Odorous Emissions. The project applicant(s) for any particular discretionary development application shall implement the following measures: ▸ The odor-producing potential of land uses shall be considered when the exact type of facility that would occupy areas zoned for	Before the approval of building permits by the City and throughout project construction,	The project applicant(s) of all project phases.	City of Folsom Community Development Department.	

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commercial, industrial, or mixed-use land uses is determined. Facilities that have the potential to emit objectionable odors shall be located as far away as feasible from existing and proposed sensitive receptors. ▸ The multi-family residences planned across from the off-site corporation yard near the southwest corner of the SPA shall be set back as far as possible from the boundary of the corporation yard and/or relocated to another area. (This measure is also required by Mitigation Measure 3A.2-4b to limit exposure to TAC emissions.) ▸ Before the approval of building permits, odor control devices shall be identified to mitigate the exposure of receptors to objectionable odors if a potential odor-producing source is to occupy an area zoned for commercial, industrial, or mixed-use land uses. The identified odor control devices shall be installed before the issuance of certificates of occupancy for the potentially odor-producing use. The odor-producing potential of a source and control devices shall be determined in coordination with SMAQMD and based on the number of complaints associated with existing sources of the same nature. ▸ The deeds to all properties located within the plan area that are within one mile of an on- or off-site area zoned or used for agricultural use (including livestock grazing) shall be accompanied by a written disclosure from the transferor, in a form approved by the City of Folsom, advising any transferee of the potential adverse odor impacts from surrounding agricultural operations, which disclosure shall direct the transferee to contact the County of Sacramento concerning any such property within the County zoned for agricultural uses within one mile of the subject property being transferred. ▸ Truck loading docks and delivery areas shall be located as far away as feasible from existing and proposed sensitive receptors. ▸ Signs shall be posted at all loading docks and truck loading areas which indicate that diesel-powered delivery trucks must be shut off when not in use for longer than 5 minutes on the premises in order to reduce idling emissions. This measure is consistent with the ATCM to Limit Diesel-Fueled Commercial Motor Vehicle Idling, which was approved by California's Office of Administrative Law in January 2005. (This measure is also required by Mitigation Measure 3A.2-4b to limit TAC emissions.) ▸ Proposed commercial and industrial land uses that have the potential to host diesel trucks shall incorporate idle reduction strategies that reduce the main propulsion engine idling time through alternative technologies such as, IdleAire, electrification of truck parking, and alternative energy sources for TRUs, to allow diesel engines to be completely turned off. (This measure is also required by Mitigation Measure 3A.2-4b to limit TAC emissions.)	where applicable, for all project phases.			
3B.2 AIR QUALITY - WATER				
Mitigation Measure 3B.2-1a: Develop and Implement a Construction NO_X Reduction Plan. Consistent with SMAQMD requirements, the City of Folsom shall provide a plan for demonstrating that the heavy-duty (> 50 horsepower) off-road vehicles to be used in the construction project, including owned, leased and subcontractor vehicles, will achieve a project wide fleet-average 20% NO_X reduction. Prior to construction, the City's contractor shall submit to the SMAQMD a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that will be used an aggregate of 40 or more hours during any portion of the construction of the Off-site Water Facilities. The inventory shall include the horsepower rating, engine production year, and projected hours of use or fuel throughput for each piece of equipment. The inventory shall be updated and submitted quarterly throughout the duration of the project, except that an inventory shall not be required for any 30-day period in which no construction activity occurs. At least 48 hours prior to the use of subject heavy-duty off-road equipment, the Off-site Water Facilities representative shall provide SMAQMD with the anticipated construction timeline including start date, and name and phone number of the project manager and on-site foreman.	Prior to construction of the Off-site Water Facilities.	City of Folsom Utilities Department	1. For improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department, City of Folsom Community Development Department, and SMAQMD. 2. For improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department and SMAQMD. 3. For improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department and SMAQMD.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
Mitigation Measure 3B.2-1b: Conduct Visible Emissions Testing and if Non-Compliance, Repair Equipment Immediately. Controlling visible emissions from off-road diesel powered equipment. The City shall ensure that emissions from all off-road diesel powered equipment used on the project site do not exceed 40% opacity for more than three minutes in any one hour. Any equipment found to exceed 40% opacity (or Ringelmann 2.0) shall be repaired immediately, and the City and SMAQMD shall be notified within 48 hours of identification of non-compliant equipment. A visual survey of all in-operation equipment shall be made at least monthly, and a quarterly summary of the visual survey results shall be submitted throughout the duration of the project, except that the monthly summary shall not be required for any 30-day period in which no construction activity occurs. The monthly summary shall include the quantity and type of vehicles surveyed as well as the dates of each survey.	During construction of all Off-site Water Facilities.	City of Folsom Utilities Department	1. For improvements that would be located within the City of Folsom: City of Folsom Neighborbood Services Department, City of Folsom Community Development Department, and SMAQMD. 2. For improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department and SMAQMD. 3. For improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department and SMAQMD.	
Mitigation Measure 3B.2-1c: Implement Fugitive Dust Control Measures and a Particulate Matter Monitoring Program during Construction. The City shall implement fugitive dust control measures and a particulate matter monitoring program during construction. The City shall ensure implementation of dust control measures and a particulate matter monitoring program during eacb phase of construction. Dust control measures may include, but are not limited to, the following: ▸ minimize on-site construction vebicle speeds on unpaved surfaces; ▸ post speed limits; ▸ suspend grading operations when wind is sufficient to generate visible dust clouds; ▸ pave, water, use gravel, cover, or spray a dust-control agent on all haul roads; ▸ Prohibit no open burning of vegetation during project construction; ▸ Chip or deliver vegetative material to waste-to-energy facilities; ▸ reestablish vegetation as soon as possible after construction and maintain vegetation consistent with the parameters established in Mitigation Measure 3B.2.1a; ▸ clean earthmoving construction equipment with water once daily and clean all haul trucks leaving the site; and ▸ water and keep moist exposed earth surfaces, graded areas, storage piles, and baul roads as needed to prevent fugitive dust.	During construction of all Off-site Water Facilities.	City of Folsom Utilities Department	1. For improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department, City of Folsom Community Development Department, and SMAQMD. 2. For improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department and SMAQMD. 3. For improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department and SMAQMD.	
Mitigation Measure 3B.2-3a: Cite Pump Siting Buffers Away from Sensitive Receptors. New pumping stations including back-up diesel generators shall be located more than 200 feet away from sensitive receptors. Electrically-powered pumps shall be used to power new pumps, to the extent practicable.	Prior to the approval of grading plans and building permits for all off-site water pumping facilities.	City of Folsom Utilities Department	1. For improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department, City of Folsom Community Development Department	

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			and SMAQMD. 2. For improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department and SMAQMD. 3. For improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department and SMAQMD.	
Mitigation Measure 3B.2-3b: Conduct Project-Level DPM Screening and Implement Measures to Reduce Annual DPM to Acceptable Concentrations. Screening-level DPM assessments shall be conducted for diesel-powered pump operations proposed within 200 feet of residences or other sensitive receptors. These analyses should include exact distances between the receptors and operations, and include the actual DPM emissions for the engines proposed. If the analysis shows an annual average DPM concentration from project operations at residences within 200 feet of the DPM source to be greater than 0.024 $\mu g/m^3$, the engine location shall be moved to a location where the annual average DPM concentration from project emissions at the residences is less than 0.024 $\mu g/m^3$. The acceptable concentration of 0.024 $\mu g/m^3$ was determined using the current OEHHA cancer potency factor and methodology for diesel exhaust (OEHHA 2003). If diesel exhaust concentrations at the affected receptor would be below 0.024 $\mu g/m^3$, then the cancer health risk would be less than 9.9 cancers in a million population.	Prior to the approval of grading plans and building permits for all off-site water pumping facilities.	City of Folsom Utilities Department	1. For improvements that would be located within the City of Folsom: City of Folsom Community Development Department and SMAQMD. 2. For improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department and SMAQMD. 3. For improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department and SMAQMD.	
3A.3 BIOLOGICAL RESOURCES - LAND				
Mitigation Measure 3A.3-1a: Design Stormwater Drainage Plans and Erosion and Sediment Control Plans to Avoid and Minimize Erosion and Runoff to All Wetlands and Other Waters That Are to Remain on the SPA and Use Low Impact Development Features. To minimize indirect effects on water quality and wetland hydrology, the project applicant(s) for any particular discretionary development application shall include stormwater drainage plans and erosion and sediment control plans in their improvement plans and shall submit these plans to the City Public Works Department for review and approval. For off-site elements within Sacramento County or El Dorado County jurisdiction (e.g., off-site detention basin and off-site roadway connections to El Dorado Hills), plans shall be submitted to the appropriate county planning department. Before approval of these improvement plans, the project applicant(s) for any particular discretionary development application shall obtain a NPDES MS4 Municipal Stormwater Permit and Grading Permit, comply with the City's Grading Ordinance and County drainage and stormwater quality standards, and commit to implementing all measures in their drainage plans and erosion and sediment control plans to avoid and minimize erosion and runoff into Alder Creek and all wetlands and other waters that would remain on-site. Detailed information about stormwater runoff standards and relevant City and County regulation is provided in Chapter 3A.9, "Hydrology and Water Quality." The project applicant(s) for any particular discretionary development entitlement shall implement stormwater quality treatment controls consistent with the Stormwater Quality Design Manual for Sacramento and South Placer Regions in effect at the time the application is submitted. Appropriate runoff controls such as berms, storm gates, off-stream detention basins, overflow collection areas, filtration systems,	Before approval of improvement and drainage plans, and on an ongoing basis throughout and after project construction, as required for all project phases.	Project applicant(s) of all project phases and on-site and off-site elements.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Public Works Department. 2. For the two roadway connections in El Dorado Hills: El Dorado County Development Services Department. 3. For the detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
and sediment traps shall be implemented to control siltation and the potential discharge of pollutants. Development plans shall incorporate Low Impact Development (LID) features, such as pervious strips, permeable pavements, bioretention ponds, vegetated swales, disconnected rain gutter downspouts, and rain gardens, where appropriate. Use of LID features is recommended by the EPA to minimize impacts on water quality, hydrology, and stream geomorphology and is specified as a method for protecting water quality in the proposed specific plan. In addition, free spanning bridge systems shall be used for all roadway crossings over wetlands and other waters that are retained in the on-site open space. These bridge systems would maintain the natural and restored channels of creeks, including the associated wetlands, and would be designed with sufficient span width and depth to provide for wildlife movement along the creek corridors even during high-flow or flood events, as specified in the 404 permit. In addition to compliance with City ordinances, the project applicant(s) for any particular discretionary development application shall prepare a Stormwater Pollution Prevention Plan (SWPPP), and implement Best Management Practices (BMPs) that comply with the General Construction Stormwater Permit from the Central Valley RWQCB, to reduce water quality effects during construction. Detailed information about the SWPPP and BMPs are provided in Chapter 3A.9, "Hydrology and Water Quality." Each project development shall result in no net change to peak flows into Alder Creek and associated tributaries, or to Buffalo Creek, Carson Creek, and Coyote Creek. The project applicant(s) shall establish a baseline of conditions for drainage on-site. The baseline-flow conditions shall be established for 2-, 5-, and 100-year storm events. These baseline conditions shall be used to develop monitoring standards for the stormwater system on the SPA. The baseline conditions, monitoring standards, and a monitoring program shall be submitted to USACE and the City for their approval. Water quality and detention basins shall be designed and constructed to ensure that the performance standards, which are described in Chapter 3A.9, "Hydrology and Water Quality," are met and shall be designed as off-stream detention basins. Discharge sites into Alder Creek and associated tributaries, as well as tributaries to Carson Creek, Coyote Creek, and Buffalo Creek, shall be monitored to ensure that preproject conditions are being met. Corrective measures shall be implemented as necessary. The mitigation measures will be satisfied when the monitoring standards are met for 5 consecutive years without undertaking corrective measures to meet the performance standard. See FEIR/FEIS Appendix S showing that the detention basin in the northeast corner of the SPA has been moved off stream. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase in consultation with the affected oversight agency(ies) (i.e., El Dorado County for the roadway connections, Sacramento County for the detention basin west of Prairie City Road, and Caltrans for the U.S. 50 interchange improvements) such that the performance standards described in Chapter 3A.9, "Hydrology and Water Quality," are met.			4. For the U.S. 50 interchange improvements: Caltrans. 5. U.S. Army Corps of Engineers, Sacramento District. 6. Central Valley Regional Water Quality Control Board.	
Mitigation Measure 3A.3-1b: Secure Clean Water Act Section 404 Permit and Implement All Permit Conditions; Ensure No Net Loss of Functions and Values of Wetlands, Other Waters of the U.S., and Waters of the State. Before the approval of grading and improvement plans and before any groundbreaking activity associated with each distinct discretionary development entitlement, the project applicant(s) for any particular discretionary development application requiring fill of wetlands or other waters of the U.S. or waters of the state shall obtain all necessary permits under Sections 401 and 404 of the CWA or the state's Porter-Cologne Act for the respective phase. For each respective discretionary development entitlement, all permits, regulatory approvals, and permit conditions for effects on wetland habitats shall be secured before implementation of any grading activities within 250 feet of waters of the U.S. or wetland habitats or lesser distance deemed sufficiently protective by a qualified biologist with approval from USFWS, including waters of the state, that potentially support Federally listed species. The project applicant(s) shall commit to replace, restore, or enhance on a "no net loss" basis (in accordance with USACE and the Central Valley RWQCB) the acreage of all wetlands and other waters of the U.S. that would be removed, lost, and/or degraded with implementation of project plans for that development increment. Wetland habitat shall be restored, enhanced, and/or replaced at an acreage and location and by methods agreeable to USACE, the Central Valley RWQCB, and the City, as appropriate, depending on agency jurisdiction, and as determined during the Section 401 and Section 404 permitting processes. As part of the Section 404 permitting process, a draft wetland mitigation and monitoring plan (MMP) shall be developed for the project on behalf of the project applicant(s). Before any ground-disturbing activities in an area that would adversely affect wetlands and before engaging in mitigation activities associated with each discretionary development entitlement, the project applicant(s) shall submit the draft wetland MMP to USACE, the Central Valley RWQCB, Sacramento County, El Dorado County, and the City for review and approval of those portions of the plan over which they have jurisdiction. The MMP would have to be finalized prior to impacting any wetlands. Once the final MMP is approved and implemented, mitigation monitoring shall continue for a minimum of 5 years from completion of mitigation, or human intervention (including recontouring and grading), or until the performance standards identified in the approved MMP have been met, whichever is longer. As part of the MMP, the project applicant(s) shall prepare and submit plans for the creation of aquatic habitat in order to adequately offset	Before the approval of grading or improvement plans or any ground-disturbing activities for any project development phase containing wetland features or other waters of the U.S.. The MMP must be approved before any impact on wetlands can occur. Mitigation shall be implemented on an ongoing basis throughout and after construction, as required.	Project applicant(s) for each discretionary development entitlement requiring fill of wetlands or other waters of the U.S. or waters of the state.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the two roadway connections in El Dorado Hills: El Dorado County Development Services Department. 3. For the detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department. 4. For the U.S. 50 interchange improvements: Caltrans. 5. U.S. Army Corps of Engineers, Sacramento District; Central Valley Regional Water Quality Control Board as	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
and replace the aquatic functions and services that would be lost at the SPA, account for the temporal loss of habitat, and contain an adequate margin of safety to reflect anticipated success. Restoration of previously altered and degraded wetlands shall be a priority of the MMP for offsetting losses of aquatic functions on the SPA because it is typically easier to achieve functional success in restored wetlands than in those created from uplands. The MMP must demonstrate how the aquatic functions and values that would be lost through project implementation will he replaced. The habitat MMP for jurisdictional wetland features shall be consistent with USACE's and EPA's April 10, 2008 Final Rule for Compensatory Mitigation for Losses of Aquatic Resources (33 CFR Parts 325 and 332 and 40 CFR Part 230) and USACE's October 26, 2010 *Memorandum Re: Minimum Level of Documentation Required for Permit Decisions*. According to the Final Rule, mitigation banks should be given preference over other types of mitigation because a lot of the risk and uncertainty regarding mitigation success is alleviated by the fact that mitigation bank wetlands must be established and demonstrating functionality before credits can be sold. The use of mitigation credits also alleviates temporal losses of wetland function while compensatory wetlands are being established. Mitigation banks also tend to be on larger, more ecologically valuable parcels and are subjected to more rigorous scientific study and planning and implementation procedures than typical permittee-responsible mitigation sites (USACE and EPA, 2008). Permittee-responsible on-site mitigation areas can be exposed to long-term negative effects of surrounding development since they tend to be smaller and less buffered than mitigation banks. The Final Rule also establishes a preference for a "watershed approach" in selecting locations for compensatory mitigation project locations, that mitigation selection must be "appropriate and practicable" and that mitigation banks must address watershed needs based on criteria set forth in the Final Rule. The watershed approach accomplishes this objective by expanding the informational and analytic basis of mitigation project site selection decisions and ensuring that both authorized impacts and mitigation are considered on a watershed scale rather than only project by project. This requires a degree of flexibility so that district engineers can authorize mitigation projects that most effectively address the case-specific circumstances and needs of the watershed, while remaining practicable for the permittee. The SPA includes portions of the Alder Creek, Buffalo Creek, Coyote Creek, and Carson Creek Watersheds. The majority of the SPA is within the Alder Creek Watershed. Alder Creek and Buffalo Creek are part of the Lower American River Watershed. Carson Creek and Coyote Creek are part of the Cosumnes River Watershed. Mitigation credits may be available within the Cosumnes Watershed, but not within the American River Watershed and not within the sub-watersheds of the SPA. Therefore aquatic habitats may need to be restored or created on the SPA and adjacent off-site lands, preferably within the affected watersheds, in order to successfully replace lost functions at the appropriate watershed scale where loss of function would occur. It is not likely feasible to provide compensatory mitigation for all aquatic resource impacts on site. Therefore, a combination of on-site and off-site permittee-responsible mitigation and mitigation banking would likely be necessary to achieve the no-net-loss standard. The SPA is located within the service areas of several approved mitigation banks (e.g., Bryte Ranch, Clay Station, Fitzgerald Ranch, and Twin City Mitigation Bank). The majority of compensatory mitigation for wetland impacts is proposed to be accomplished at an agency-approved mitigation bank or banks authorized to sell credits to offset impacts in the SPA. The applicants' biological consultant, ECORP, has identified availability of approximately 31 vernal pool credits and 228 seasonal wetland credits at mitigation banks whose service area includes the SPA. Additional credits may also be available from pending, but not yet approved, mitigation banks. However, availability is subject to change and, as noted above, a combination of mitigation bank credits and permittee-responsible on and off-site mitigation may be necessary to fully offset project impacts on wetlands and other waters of the U.S. If USACE determines that the use of mitigation bank credits is not sufficient mitigation to offset impacts within the SPA, the October 26, 2010 Memorandum Re: Minimum Level of Documentation Required for Permit Decisions requires USACE to specifically demonstrate why the use of bank credits is not acceptable to USACE in accordance with Section 33 CFR 332.3(a)(1). Compensatory mitigation for losses of stream and intermittent drainage channels shall follow the Final Rule Guidelines , which specify that compensatory mitigation should be achieved through in-kind preservation, restoration, or enhancementwithin the same watershed, subject to practicability considerations. The wetland MMP shall address how to mitigate impacts on vernal pool, seasonal swale, seasonal wetland, seep, marsh, pond, and intermittent and perennial stream habitat, and shall describe specific method(s) to be implemented to avoid and/or mitigate any off-site project-related impacts. The wetland compensation section of the habitat MMP shall include the following: ▸ Compensatory mitigation sites and criteria for selecting these mitigation sites. In General, compensatory mitigation sites should meet the following criteria, based on the Final Rule; • located within the same watershed as the wetland or other waters that would be lost, as appropriate and practicable; • located in the most likely position to successfully replace wetland functions lost on the impact site considering watershed-scale features such as aquatic habitat diversity, habitat connectivity, available water sources and hydrologic relationships, land use trends, ecological benefits, and compatibility with adjacent land uses, and the likelihood for success and sustainability; ▸ A complete assessment of the existing biological resources in both the on-site preservation areas and off-site compensatory mitigation			appropriate depending on agency jurisdiction, and as determined during the Section 401 and Section 404 permitting processes and in compliance with the City's Grading Ordinance (Folsom Municipal Code 14.29), or appropriate county grading ordinance for off-site detention basin and roadway connections from Folsom Heights to El Dorado Hills.	

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areas, including wetland functional assessment using the California Rapid Assessment Method (CRAM) (Collins et al. 2008), or other appropriate wetland assessment protocol as determined through consultation with USACE and the USFWS, to establish baseline conditions; ► Specific creation and restoration plans for each mitigation site; ► Use of CRAM to compare compensatory wetlands to the baseline CRAM scores from wetlands in the SPA. The compensatory wetland CRAM scores shall be compared against the highest quality wetland of each type from the SPA; ► CRAM scores, or other wetland assessment protocol scores, from the compensatory wetlands shall be compared against the highest quality wetland scores for each wetland type to document success of compensatory wetlands in replacing the functions of the affected wetlands to be replaced; ► Monitoring protocol, including schedule and annual report requirements, and the following elements: • ecological performance standards, based on the best available science, that can be assessed in a practicable manner (e.g., performance standards proposed by Barbour et al. 2007). Performance standards must be based on attributes that are objective and verifiable; • assessments conducted annually for 5 years after construction or restoration of compensatory wetlands to determine whether these areas are acquiring wetland functions and to plot the performance trajectory of preserved, restored, or created wetlands over time. Assessments results for compensatory wetlands shall also be compared against scores for reference wetlands assessed in the same year; • assessments analysis conducted annually for 5 years after any construction adjacent to wetlands preserved on the SPA to determine whether these areas are retaining functions and values. Assessments results for wetlands preserved on site shall also be compared against scores for reference wetlands assessed in the same year; • analysis of assessments data, including assessment of potential stressors, to determine whether any remedial activities may be necessary; • corrective measures if performance standards are not met; • monitoring of plant communities as performance criteria (annual measure of success, during monitoring period) and success criteria (indicative of achievement of mitigation habitat requirement at end of monitoring period) for hydrologic function have become established and the creation site "matures" over time; • GIS analysis of compensatory wetlands to demonstrate actual acreage of functioning wetland habitat; • adaptive management measures to be applied if performance standards and acreage requirements are not being met; • responsible parties for monitoring and preparing reports; and • responsible parties for receiving and reviewing reports and for verifying success or prescribing implementation or corrective actions. A final operations and management plan (OMP) for all on- and off-site permittee-sponsored wetland preservation and mitigation areas shall be prepared and submitted to USACE and USFWS for review, comment and preliminary approval prior to the issuance of any permits under Section 404 of the CWA. The plan shall include detailed information on the habitats present within the preservation and mitigation areas, the long-term management and monitoring of these habitats, legal protection for the preservation and mitigation areas (e.g., conservation easement, declaration of restrictions), and funding mechanism information (e.g., endowment). A final OMP for each discretionary development entitlement affecting wetlands must be approved prior to construction. USACE has determined that the project will require an individual permit. In its final stage and once approved by USACE, the MMP for the project is expected to detail proposed wetland restoration, enhancement, and/or replacement activities that would ensure no net loss of aquatic functions in the project vicinity. Approval and implementation of the wetland MMP shall aim to fully mitigate all unavoidable impacts on jurisdictional waters of the U.S., including jurisdictional wetlands. In addition to USACE approval, approval by the City, Sacramento County, El Dorado County, and the Central Valley RWQCB, as appropriate depending on agency jurisdiction, and as determined during the Section 401 and Section 404 permitting processes, will also be required. Approvals from Sacramento County and El Dorado County shall be required for impacts resulting from off-site project elements occurring in these counties, such as the off-site detention basin in Sacramento County and the roadway connections into El Dorado County. To satisfy the requirements of the City and the Central Valley RWQCB, mitigation of impacts on the nonjurisdictional wetlands beyond the jurisdiction of USACE shall be included in the same MMP. All mitigation requirements determined through this process shall be implemented before grading plans are approved. The MMP shall be submitted to USACE and approved prior to the issuance of any permits under Section 404 of the CWA.				

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
Water quality certification pursuant to Section 401 of the CWA will be required before issuance of a Section 404 permit. Before construction in any areas containing wetland features, the project applicant(s) shall obtain water quality certification for the project. Any measures required as part of the issuance of water quality certification shall be implemented. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be developed by the project applicant(s) of each applicable project phase in consultation with the affected oversight agency(ies) (i.e., Caltrans, El Dorado and/or Sacramento Counties).				
Mitigation Measure 3A.3-2a: Avoid Direct Loss of Swainson's Hawk and Other Raptor Nests. To mitigate impacts on Swainson's hawk and other raptors (including burrowing owl), the project applicant(s) of all project phases shall retain a qualified biologist to conduct preconstruction surveys and to identify active nests on and within 0.5 mile of the SPA and active burrows on the SPA. The surveys shall be conducted before the approval of grading and/or improvement plans (as applicable) and no less than 14 days and no more than 30 days before the beginning of construction for all project phases. To the extent feasible, guidelines provided in Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in the Central Valley (Swainson's Hawk Technical Advisory Committee 2000) shall be followed for surveys for Swainson's hawk. If no nests are found, no further mitigation is required. If active nests are found, impacts on nesting Swainson's hawks and other raptors shall be avoided by establishing appropriate buffers around the nests. No project activity shall commence within the buffer area until the young have fledged, the nest is no longer active, or until a qualified biologist has determined in consultation with DFG that reducing the buffer would not result in nest abandonment. DFG guidelines recommend implementation of 0.25- or 0.5-mile-wide buffers, but the size of the buffer may be adjusted if a qualified biologist and the City, in consultation with DFG, determine that such an adjustment would not be likely to adversely affect the nest. Monitoring of the nest by a qualified biologist during and after construction activities will be required if the activity has potential to adversely affect the nest. If active burrows are found, a mitigation plan shall be submitted to the City for review and approval before any ground-disturbing activities. The City shall consult with DFG. The mitigation plan may consist of installation of one-way doors on all burrows to allow owls to exit, but not reenter, and construction of artificial burrows within the project vicinity, as needed; however, burrow owl exclusions may only be used if a qualified biologist verifies that the burrow does not contain eggs or dependent young. If active burrows contain eggs and/or young, no construction shall occur within 50 feet of the burrow until young have fledged. Once it is confirmed that there are no owls inside burrows, these burrows may be collapsed. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be developed by the project applicant(s) of each applicable project phase in consultation with the affected oversight agency(ies) (i.e., El Dorado and/or Sacramento Counties, or Caltrans), such that the performance criteria set forth in DFG's guidelines are determined to be met.	Before the approval of grading and improvement plans, before any ground-disturbing activities, and during project construction as applicable for all project phases.	Project applicant(s) of all project phases.	1. California Department of Fish and Game. 2. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 3. For the two roadway connections in El Dorado Hills: El Dorado County Development Services Department. 4. For the U.S. 50 interchange improvements: Caltrans. 5. For the detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department.	
Mitigation Measure 3A.3-2b: Prepare and Implement a Swainson's Hawk Mitigation Plan. To mitigate for the loss of Swainson's hawk foraging habitat, the project applicant(s) of all project phases shall prepare and implement a Swainson's hawk mitigation plan including, but not limited to the requirements described below. Before the approval of grading and improvement plans or before any ground-disturbing activities, whichever occurs first, the project applicant(s) shall preserve, to the satisfaction of the City or Sacramento County, as appropriate depending on agency jurisdiction, suitable Swainson's hawk foraging habitat to ensure 1:1 mitigation of habitat value for Swainson's hawk foraging habitat lost as a result of the project, as determined by the City, or Sacramento County, after consultation with DFG and a qualified biologist. The 1:1 habitat value shall be based on Swainson's hawk nesting distribution and an assessment of habitat quality, availability, and use within the City's planning area, or Sacramento County jurisdiction. The mitigation ratio shall be consistent with the 1994 DFG *Swainson's Hawk Guidelines included in the Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (*Buteo swainsoni*) in the Central Valley of California*, which call for the following mitigation ratios for loss of foraging habitat in these categories: 1:1 if within 1 mile of an active nest site, 0.75:1 if over 1 mile but less than 5 miles, and 0.5:1 if over 5 miles but less than 10 miles from an active nest site. Such mitigation shall be accomplished through credit purchase from an established mitigation bank approved to sell Swainson's hawk foraging habitat credits to mitigate losses in the SPA, if available, or through the transfer of fee title or perpetual conservation easement. The mitigation land shall be located within the known foraging area and within Sacramento County. The City, or Sacramento County if outside City jurisdiction, after consultation with DFG, will determine the appropriateness of the mitigation land. Before approval of such proposed mitigation, the City, or Sacramento County for the off-site detention basin, shall consult with DFG regarding the appropriateness of the mitigation. If mitigation is accomplished through conservation easement, then such an easement shall ensure the continued management of the land to maintain Swainson's hawk foraging values, including but not limited to ongoing agricultural uses and the maintenance of all existing water rights associated with the land. The conservation easement shall be recordable and shall prohibit any activity that substantially impairs or diminishes the land's capacity as suitable Swainson's hawk habitat.	Before the approval of grading, improvement, or construction plans and before any ground-disturbing activity in any project development phase that would affect Swainson's hawk foraging habitat.	Project applicant(s) of all project phases.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department. 3. For the U.S. 50 interchange improvements: Caltrans.	

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The project applicant(s) shall transfer said Swainson's hawk mitigation land, through either conservation easement or fee title, to a third-party, nonprofit conservation organization (Conservation Operator), with the City and DFG named as third-party beneficiaries. The Conservation Operator shall be a qualified conservation easement land manager that manages land as its primary function. Additionally, the Conservation Operator shall be a tax-exempt nonprofit conservation organization that meets the criteria of Civil Code Section 815.3(a) and shall be selected or approved by the City or County, after consultation with DFG. The City, or County, after consultation with DFG and the Conservation Operator, shall approve the content and form of the conservation easement. The City, or County, DFG, and the Conservation Operator shall each have the power to enforce the terms of the conservation easement. The Conservation Operator shall monitor the easement in perpetuity to assure compliance with the terms of the easement. The project applicant(s), after consultation with the City, or County of jurisdiction, DFG, and the Conservation Operator, shall establish an endowment or some other financial mechanism that is sufficient to fund in perpetuity the operation, maintenance, management, and enforcement of the conservation easement. If an endowment is used, either the endowment funds shall be submitted to the City for impacts on lands within the City's jurisdiction or Sacramento County for the off-site detention basin to be distributed to an appropriate third-party nonprofit conservation agency, or they shall be submitted directly to the third-party nonprofit conservation agency in exchange for an agreement to manage and maintain the lands in perpetuity. The Conservation Operator shall not sell, lease, or transfer any interest of any conservation easement or mitigation land it acquires without prior written approval of the City and DFG. Mitigation lands established or acquired for impacts incurred at the off-site detention basin shall require approval from Sacramento County prior to sale or transfer of mitigation lands or conservation easement. If the Conservation Operator ceases to exist, the duty to hold, administer, manage, maintain, and enforce the interest shall be transferred to another entity acceptable to the City and DFG, or Sacramento County and DFG depending on jurisdiction of the affected habitat. The City Planning Department shall ensure that mitigation habitat established for impacts on habitat within the City's planning area is properly established and is functioning as habitat by reviewing regular monitoring reports prepared by the Conservation Operator of the mitigation site(s). Monitoring of the mitigation site(s) shall continue for the first 10 years after establishment of the easement and shall be funded through the endowment, or other appropriate funding mechanism, established by the project applicant(s). Sacramento County shall review the monitoring reports for impacts on habitat at the off-site detention basin. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., Sacramento County and Caltrans).				
Mitigation Measure 3A.3-2c: Avoid and Minimize Impacts to Tricolored Blackbird Nesting Colonies. To avoid and minimize impacts to tricolored blackbird, the project applicant(s) of all project phases shall conduct a preconstruction survey for any project activity that would occur during the tricolored blackbird's nesting season (March 1–August 31). The preconstruction survey shall be conducted by a qualified biologist before any activity occurring within 500 feet of suitable nesting habitat, including freshwater marsh and areas of riparian scrub vegetation. The survey shall be conducted within 14 days before project activity begins. If no tricolored blackbird colony is present, no further mitigation is required. If a colony is found, the qualified biologist shall establish a buffer around the nesting colony. No project activity shall commence within the buffer area until a qualified biologist confirms that the colony is no longer active. The size of the buffer shall be determined in consultation with DFG. Buffer size is anticipated to range from 100 to 500 feet, depending on the nature of the project activity, the extent of existing disturbance in the area, and other relevant circumstances. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries (i.e., U.S. 50 interchange improvements) must be developed by the project applicant(s) of each applicable project phase in consultation with the affected oversight agency(ies) (i.e., Caltrans) and must be sufficient to achieve the performance criteria described above.	Before the approval of any ground-disturbing activity within 500 feet of suitable nesting habitat as applicable for all project phases.	Project applicant(s) of all project phases.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the U.S. 50 interchange improvements: Caltrans.	
Mitigation Measure 3A.3-2d: Avoid and Minimize Impacts to Special-Status Bat Roosts. The project applicant of all project phases containing potential bat roosting habitat shall retain a qualified biologist to conduct surveys for roosting bats. Surveys shall be conducted in the fall to determine if the mine shaft is used as a hibernaculum and in spring and/or summer to determine if it is used as a maternity or day roost. Surveys shall consist of evening emergence surveys to note the presence or absence of bats and could consist of visual surveys at the time of emergence. If evidence of bat use is observed, the number and species of bats using the roost shall be determined. Bat detectors may be used to supplement survey efforts. If no bat roosts are found, then no further study shall be required. If roosts of pallid bat or Townsend's big-eared bats are determined to be present and must be removed, the bats shall be excluded from the roosting site before the mine shaft is removed. A mitigation program addressing compensation, exclusion methods, and roost removal procedures shall be developed in consultation with DFG before implementation. Exclusion methods may include use of one-way doors at roost entrances (bats may leave but not reenter), or sealing roost entrances when the site can be confirmed to contain no bats. Exclusion efforts may be restricted during periods of sensitive activity (e.g., during hibernation or while females in maternity colonies are nursing	Before the approval of removal or fill of the mine shaft on the SPA.	Project applicant(s) of all project phases containing potential bat roosting habitat.	City of Folsom Community Development Department.	

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young). The loss of each roost (if any) will be replaced in consultation with DFG and may include construction and installation of bat boxes suitable to the bat species and colony size excluded from the original roosting site. Roost replacement will be implemented before bats are excluded from the original roost sites. Once the replacement roosts are constructed and it is confirmed that bats are not present in the original roost site, the mine shaft may be removed.				
Mitigation Measure 3A.3-2e: Obtain an Incidental Take Permit under Section 10(a) of ESA; Develop and Implement a Habitat Conservation Plan to Compensate for the Loss of Vernal Pool Habitat. The project applicant(s) for all project phases shall obtain an incidental take permit under Section 10(a) of ESA. No project construction shall proceed in areas supporting potential habitat for Federally listed vernal pool invertebrates, or within adequate buffer areas (250 feet or lesser distance deemed sufficiently protective by a qualified biologist with approval from USFWS), until a BO has been issued by USFWS and the project applicant(s) have abided by conditions in the BO (including all conservation and minimization measures). Conservation and minimization measures are likely to include preparation of supporting documentation describing methods to protect existing vernal pools during and after project construction. Under the No Federal Action Alternative, interagency consultation under Section 7 of ESA would not occur; therefore, the project applicant(s) would be required to develop a habitat conservation plan to mitigate impacts on Federally listed vernal pool invertebrates. The project applicant(s) shall complete and implement, or participate in, a habitat conservation plan that shall compensate for the loss of acreage, function, and value of affected vernal pool habitat. The habitat conservation plan shall be consistent with the goals of the Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (USFWS 2005) and must be approved by USFWS. The project applicant(s) for all project phases shall ensure that there is sufficient upland habitat within the target areas for creation and restoration of vernal pools and vernal pool complexes to provide ecosystem health. The land used to satisfy this mitigation measure shall be protected through a fee title or conservation easement acceptable to the City and USFWS. The project applicant(s) for all project phases shall identify the extent of indirectly affected vernal pool and seasonal wetland habitat, either by identifying all such habitat within 250 feet of project construction activities or by providing an alternative technical evaluation in support of a lesser indirect impact distance. If a lesser distance is pursued, this distance shall be approved by USFWS. The project applicant(s) shall preserve 2 wetted acres of vernal pool habitat for each wetted acre of any indirectly affected vernal pool habitat. This mitigation shall occur before the approval of any grading or improvement plans for any project phase that would allow work within 250 feet of such habitat, and before any ground-disturbing activity within 250 feet of the habitat. The project applicant(s) will not be required to complete this mitigation measure for direct or indirect impacts that have already been mitigated to the satisfaction of USFWS through another BO or mitigation plan. A standard set of BMPs shall be applied to construction occurring in areas within 250 feet of off-site vernal pool habitat, or within any lesser distance deemed adequate by a qualified biologist (with approval from USFWS) to constitute a sufficient buffer from such habitat. Refer to Section 3A.9, "Hydrology and Water Quality - Land" for the details of BMPs to be implemented. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., El Dorado and/or Sacramento Counties or Caltrans).	Before the approval of any grading or improvement plans, before any ground-disturbing activities within 250 feet of said habitat, and on an ongoing basis throughout construction as applicable for all project phases as required by the habitat conservation plan and/or BO.	Project applicant(s) of all project phases and on-site and off-site elements.	1. U.S. Fish and Wildlife Service. 2. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 3. For the two roadway connections in El Dorado Hills: El Dorado County Development Services Department. 4. For the detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department. 5. For the U.S. 50 interchange improvements: Caltrans.	
Mitigation Measure 3A.3-2f: Obtain an Incidental Take Permit under Section 10(a) of ESA; Develop and Implement a Habitat Conservation Plan to Compensate for the Loss of VELB Habitat. As long as valley elderberry longhorn beetle remains a species protected under ESA, the project applicant(s) of all project phases containing elderberry shrubs shall obtain an incidental take permit under Section 10(a) of ESA for valley elderberry longhorn beetle. No project construction shall proceed in areas potentially containing valley elderberry longhorn beetle until a BO has been issued by USFWS, and the project applicant(s) for all project phases have abided by all pertinent conditions in the take permit relating to the proposed construction, including all conservation and minimization measures. Conservation and minimization measures are likely to include preparation of supporting documentation that describes methods for relocation of existing shrubs and maintaining existing shrubs and other vegetation in a conservation area. Under the No Federal Action Alternative, interagency consultation under Section 7 of ESA would not occur; therefore, the project applicant(s) would be required to develop a habitat conservation plan to mitigate impacts on valley elderberry longhorn beetle. The project applicant(s) shall complete and implement a habitat conservation plan that will compensate for the loss of valley elderberry longhorn beetle. Relocation of existing elderberry shrubs and planting of new elderberry seedlings shall be implemented on a no-net-loss basis. Detailed information on monitoring success of relocated and planted shrubs and measures to compensate (should success criteria not be met) would also likely be required in the BO. Ratios for mitigation of valley elderberry longhorn beetle habitat will ultimately be determined through the ESA Section 10(a) consultation process with USFWS, but shall be a minimum of "no net loss." Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries (i.e., U.S. 50 interchange improvements) must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., Caltrans).	Before the approval of any grading or improvement plans or any ground-disturbing activity within 100 feet of valley elderberry longhorn beetle habitat as applicable for all project phases, and on an ongoing basis as required by the habitat conservation plan and/or BO.	Project applicant(s) of all project phases potentially containing elderberry shrubs.	1. U.S. Fish and Wildlife Service 2. City of Folsom Community Development Department. 3. For the U.S. 50 interchange improvements: Caltrans.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
Mitigation Measure 3A.3-2g: Secure Take Authorization for Federally Listed Vernal Pool Invertebrates and Implement All Permit Conditions. No project construction shall proceed in areas supporting potential habitat for Federally listed vernal pool invertebrates, or within adequate buffer areas (250 feet or lesser distance deemed sufficiently protective by a qualified biologist with approval from USFWS), until a biological opinion (BO) or Not Likely to Adversely Affect (NLAA) letter has been issued by USFWS and the project applicant(s) for any particular discretionary development entitlements affecting such areas have abided by conditions in the BO (including conservation and minimization measures) intended to be completed before on-site construction. Conservation and minimization measures shall include preparation of supporting documentation describing methods to protect existing vernal pools during and after project construction, a detailed monitoring plan, and reporting requirements. As described under Mitigation Measure 3A.3-1a, an MMP shall be developed that describes details how loss of vernal pool and other wetland habitats shall be offset, including details on creation of habitat, account for the temporal loss of habitat, contain performance standards to ensure success, and outline remedial actions if performance standards are not met. The project applicant(s) for any particular discretionary development application potentially affecting vernal pool habitat shall complete and implement a habitat MMP that will result in no net loss of acreage, function, and value of affected vernal pool habitat. The final habitat MMP shall be consistent with guidance provided in *Programmatic Formal Endangered Species Act Consultation on Issuance of 404 Permits for Projects with Relatively Small Effects on Listed Vernal Pool Crustaceans within the Jurisdiction of the Sacramento Field Office, California* (USFWS 1996) or shall provide an alternative approach that is acceptable to the City, USACE, and USFWS and accomplishes no net loss of habitat acreage, function, and value. The project applicant(s) for any particular discretionary development application "potentially affecting vernal pool habitat" shall ensure that there is sufficient upland habitat within the target areas for creation and restoration of vernal pools and vernal pool complexes to provide ecosystem health. This standard shall be accomplished by requiring the project applicant(s) for any discretionary development application affecting vernal pool or seasonal wetland habitat to identify the extent of indirectly affected vernal pool and seasonal wetland habitat, either by identifying all such habitat within 250 feet of project construction activities or by providing an alternative technical evaluation. If a lesser distance is pursued, this distance shall be approved by USFWS. The project applicant(s) shall preserve acreage of vernal pool habitat for each wetted acre of any indirectly affected vernal pool habitat at a ratio approved by USFWS at the conclusion of the Section 7 consultation. This mitigation shall occur before the approval of any grading or improvement plans for any project phase that would allow work within 250 feet of such habitat or lesser distance deemed sufficiently protective by a qualified biologist with approval from USFWS, and before any ground-disturbing activity within 250 feet of the habitat or lesser distance deemed sufficiently protective by a qualified biologist with approval from USFWS. The project applicant(s) will not be required to complete this mitigation measure for direct or indirect impacts that have already been mitigated to the satisfaction of USFWS through another BO or mitigation plan (i.e., if impacts on specific habitat acreage are mitigated by one project phase or element, the project applicant(s) will not be required to mitigate for it again in another phase of the project). A standard set of BMPs shall be applied to construction occurring in areas within 250 feet of off-site vernal pool habitat, or within any lesser distance deemed adequate by a qualified biologist (with approval from USFWS) to constitute a sufficient buffer from such habitat. Refer to Section 3A.9, "Hydrology and Water Quality - Land" for the details of BMPs to be implemented. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be developed by the project applicant(s) of each applicable project phase in consultation with the affected oversight agency(ies) (i.e., El Dorado and/or Sacramento Counties, or Caltrans).	Before the approval of any grading or improvement plans, before any ground-disturbing activities within 250 feet of said habitat or lesser distance deemed sufficiently protective by a qualified biologist with approval from USFWS, and on an ongoing basis throughout construction as applicable for all project phases as required by the mitigation plan, BO, and/or BMPs.	Project applicant(s) of all project phases.	1. U.S. Army Corps of Engineers, Sacramento District; U.S. Fish and Wildlife Service. 2. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 3. For the two roadway connections in El Dorado Hills: El Dorado County Development Services Department. 4. For the U.S. 50 interchange improvements: Caltrans. 5. For the detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department.	
Mitigation Measure 3A.3-2h: Obtain Incidental Take Permit for Impacts on Valley Elderberry Longhorn Beetle and Implement All Permit Conditions. Before each phase of the project, the project applicant(s) shall have a qualified biologist identify any elderberry shrubs within 100 feet of the project footprint and conduct a survey for valley elderberry longhorn beetle exit holes in stems greater than 1 inch in diameter. If no project activity, including grading or use of herbicides, would occur within 100 feet of an elderberry shrub, then no further mitigation shall be required for valley elderberry longhorn beetle in those areas. If project activities would occur within 100 feet of any elderberry shrubs, consultation with USFWS under Section 7 will be required. No project construction shall proceed in areas potentially containing valley elderberry longhorn beetle until a BO has been issued by USFWS, and the project applicant(s) of all project phases have abided by all pertinent conditions in the BO relating to the proposed construction, including conservation and minimization measures, intended to be completed before on-site construction. Conservation and minimization measures are likely to include preparation of supporting documentation that describes methods for relocation of existing shrubs and maintaining existing shrubs and other vegetation in a conservation area. Relocation of existing elderberry shrubs and planting of new elderberry seedlings shall be implemented consistent with the mitigation ratios	Before the approval of any grading or improvement plans or any ground-disturbing activity within 100 feet of valley elderberry longhorn beetle habitat as applicable for all project phases, and on an ongoing basis as required by BO.	Project applicant(s) of all project phases.	1. U.S. Army Corps of Engineers, Sacramento District; U.S. Fish and Wildlife Service. 2. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 3. For the U.S. 50 interchange improvements: Caltrans.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
described in the Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USFWS 1999). The 1999 conservation guidelines mitigation ratios are based on whether the affected shrub is located in riparian or non riparian habitat, the size of stems affected, and the presence of beetle exit holes. Compensatory mitigation for elderberry shrubs that would be removed from their current locations would be developed in consultation with USFWS during the Section 7 consultation process. Compensatory mitigation may include planting replacement elderberry seedlings or cuttings and associated native plants within the open space areas of the SPA, planting replacement elderberry seedlings or cuttings and associated native plants at a suitable off-site location, purchasing credits at an approved mitigation bank, or a combination thereof. Relocated and replacement shrubs and associated native plantings shall be placed in conservation areas providing a minimum of 1,800 square feet per transplanted shrub. These conservation areas shall be preserved in perpetuity as habitat for valley elderberry longhorn beetle. The number of elderberry shrubs that would be affected by implementing the project is expected to be low because there are currently a total of less than 10 shrubs known to be present on the SPA. Ratios for mitigation of valley elderberry longhorn beetle habitat will ultimately be determined through the ESA Section 7 consultation process with USFWS, but shall be a minimum of "no net loss." USFWS uses stem count data, presence or absence of exit holes, and whether the affected elderberry shrubs are located in riparian habitat to determine the number of elderberry seedlings or cuttings and associated riparian vegetation that would need to be planted as compensatory mitigation for affected elderberry longhorn beetle habitat. The final VELB mitigation plan, including transplanting procedures, long-term protection, management of the mitigation areas, and monitoring procedures shall be consistent with the Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USFWS 1999). The population of valley elderberry longhorn beetles, the general condition of the conservation area, and the condition of the elderberry and associated native plantings in the conservation area must be monitored over a period of either ten consecutive years or for seven years over a 15-year period. A minimum survival rate of at least 60% of the elderberry plants and 60% of the associated native plants must be maintained throughout the monitoring period. Within one year of discovering that survival has dropped below 60%, the project applicant(s) shall replace failed plantings to bring survival above this level. Detailed information on monitoring success of relocated and planted shrubs and measures to compensate (should success criteria not be met) would be required in the BO. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries (i.e., U.S. 50 interchange improvements) must be developed by the project applicant(s) of each applicable project phase in consultation with the affected oversight agency(ies) (i.e., Caltrans) and must be sufficient to achieve the performance criteria described above.				
Mitigation Measure 3A.3-3: Conduct Special-Status Plant Surveys; Implement Avoidance and Mitigation Measures or Compensatory Mitigation. To mitigate for the potential loss or degradation of special-status plant species and habitat, the project applicant(s) for any particular discretionary development application shall adhere to the requirements described below. ► The project applicant(s) for any particular discretionary development application, including the proposed off-site elements, shall retain a qualified botanist to conduct protocol level preconstruction special-status plant surveys for all potentially occurring species. Preconstruction special-status plant surveys shall not be required for those portions of the SPA that have already been surveyed according to DFG and USFWS guidelines. If no special-status plants are found during focused surveys, the botanist shall document the findings in a letter report to USFWS, DFG, the City of Folsom, Caltrans (for interchange improvements to U.S. 50), El Dorado County (for roadway connections in El Dorado County), and Sacramento County (for the off-site detention basin) and no further mitigation shall be required. ► If special-status plant populations are found, the project applicant(s) of affected developments shall consult with DFG and USFWS, as appropriate depending on species status, to determine the appropriate mitigation measures for direct and indirect impacts on any special-status plant population that could occur as a result of project implementation. Mitigation measures may include preserving and enhancing existing populations, creation of off-site populations on project mitigation sites through seed collection or transplantation, and/or restoring or creating suitable habitat in sufficient quantities to achieve no net loss of occupied habitat or individuals. ► If potential impacts on special-status plant species are likely, a mitigation and monitoring plan shall be developed before the approval of grading plans or any ground-breaking activity within 250 feet of a special-status plant population. The mitigation plan shall be submitted to Caltrans (for interchange improvements to U.S. 50), El Dorado County (for impacts in roadway connections in El Dorado County), Sacramento County (for impacts in the off-site detention basin footprint), or the City of Folsom (for on-site impacts and all other off-site elements), for review and approval. It shall be submitted concurrently to DFG or USFWS, as appropriate depending on species status, for review and comment. The plan shall require maintaining viable plant populations on-site and shall identify avoidance measures for any existing population(s) to be retained and compensatory measures for any populations directly affected. Possible avoidance measures include fencing populations before construction and exclusion of project activities from the fenced-off areas, and construction	Before approval of grading or improvement plans or any ground disturbing activities, including grubbing or clearing, for any project phase, including off-site elements.	Project applicant(s) of all project phases and on- and off-site elements.	1. U.S. Fish and Wildlife Service, California Department of Fish and Game. 2. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 3. For the two roadway connections in El Dorado Hills: El Dorado County Development Services Department. 4. For the detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department. 5. For the U.S. 50 interchange improvements: Caltrans.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
monitoring by a qualified botanist to keep construction crews away from the population. The mitigation plan shall also include monitoring and reporting requirements for populations to be preserved on site or protected or enhanced off site. ▸ If relocation efforts are part of the mitigation plan, the plan shall include details on the methods to be used, including collection, storage, propagation, receptor site preparation, installation, long-term protection and management, monitoring and reporting requirements, and remedial action responsibilities should the initial effort fail to meet long-term monitoring requirements. ▸ If off-site mitigation includes dedication of conservation easements, purchase of mitigation credits or other off-site conservation measures, the details of these measures shall be included in the mitigation plan, including information on responsible parties for long-term management, conservation easement holders, long-term management requirements, and other details, as appropriate to target the preservation on long term viable populations. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., Caltrans, El Dorado and/or Sacramento Counties).				
Mitigation Measure 3A.3-4a: Secure and Implement Section 1602 Streambed Alteration Agreement. The project applicant(s) for any particular discretionary development application shall obtain a Section 1602 streambed alteration agreement from DFG for all construction activities that would occur in the bed and bank of Alder Creek and other drainage channels and ponds on the SPA. As a condition of issuance of the streambed alteration agreement, the project applicant(s) for any particular discretionary development application affecting riparian habitat shall hire a qualified restoration ecologist to prepare a riparian habitat MMP. The draft MMP shall describe specific method(s) to be implemented to avoid and/or compensate for impacts on the stream channel of Alder Creek and other drainage channels within DFG jurisdiction, and the bed and banks of the on-site ponds. Mitigation measures may include establishment or restoration of riparian habitat within the project's open space areas along preserved stream corridors, riparian habitat restoration off-site, or preservation and enhancement of existing riparian habitat either on or off the SPA. The compensation habitat shall be similar in composition and structure to the habitat to be removed and shall be at ratios adequate to offset the loss of riparian habitat functions and services at the SPA. The riparian habitat compensation section of the habitat MMP shall include the following: ▸ compensatory mitigation sites and criteria for selecting these mitigation sites; ▸ complete assessment of the existing biological resources in both the on-site and off-site preservation and restoration areas; ▸ site-specific management procedures to benefit establishment and maintenance of native riparian plant species, including black willow, arroyo willow, white alder, and Fremont cottonwood; ▸ a planting and irrigation program if needed for establishment of native riparian trees and shrubs at strategic locations within each mitigation site (planting and irrigation may not be necessary if preservation of functioning riparian habitat is chosen as mitigation or if restoration can be accomplished without irrigation or planting); ▸ in kind reference habitats for comparison with compensatory riparian habitats (using performance and success criteria) to document success; ▸ monitoring protocol, including schedule and annual report requirements (compensatory riparian habitats shall be monitored for a minimum period of five years); ▸ ecological performance standards, based on the best available science and including specifications for native riparian plant densities, species composition, amount of dead woody vegetation gaps and bare ground, and survivorship; at a minimum, compensatory mitigation planting sites must achieve 80% survival of planted riparian trees and shrubs by the end of the five-year maintenance and monitoring period or dead and dying trees shall be replaced and monitoring continued until 80% survivorship is achieved; ▸ corrective measures if performance standards are not met; ▸ responsible parties for monitoring and preparing reports; and ▸ responsible parties for receiving and reviewing reports and for verifying success or prescribing implementation or corrective actions. Any conditions of issuance of the Streambed Alteration Agreement shall be implemented as part of project construction activities that adversely affect the bed and bank and riparian habitat associated with Alder Creek and other drainage channels and ponds that are within the project area that is subject to DFG jurisdiction. The agreement shall be executed by the project applicant(s) and DFG before the approval of any grading or improvement plans or any construction activities in any project phase that could potentially affect the bed and bank of Alder Creek and other on-site or off-site drainage channels under DFG jurisdiction and their associated freshwater marsh and riparian habitat. Mitigation for the U.S. 50 interchange improvements must be coordinated by the project applicant(s) of each applicable project phase with the Caltrans.	Before the approval of grading or improvement plans or any construction activities (including clearing and grubbing) that affect the bed and bank or riparian and freshwater marsh habitat associated with Alder Creek and other on-site or off-site drainage channels and ponds.	Project applicant(s) of all project phases and the off-site Prairie City Road and Oak Avenue interchange improvements.	1. California Department of Fish and Game, 2. City of Folsom Community Development Department. 3. Caltrans for interchange improvements to U.S. 50.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
Mitigation Measure 3A.3-4b: Conduct Surveys to Identify and Map Valley Needlegrass Grassland; Implement Avoidance and Minimization Measures or Compensatory Mitigation. The project applicant(s) of all project phases shall retain a qualified botanist to conduct preconstruction surveys to determine if valley needlegrass grassland is present on the SPA. This could be done concurrently with any special-status plant surveys conducted on site as special-status plant surveys are floristic in nature, i.e. require that all species encountered be identified, and require preparation of a plant community map. If valley needlegrass grassland is not found on the SPA, the botanist shall document the findings in a letter report to the City of Folsom, and no further mitigation shall be required. Valley needlegrass grassland was not found in any of the off-site project elements. If valley needlegrass grassland is found on the SPA, the location and extent of the community shall be mapped and the acreage of this community type, if any, that would be removed by project implementation shall be calculated. The project applicant(s) for any particular discretionary development application affecting valley needlegrass grassland shall consult with DFG and the City of Folsom to determine appropriate mitigation for removal of valley needlegrass grassland resulting from project implementation. Mitigation measures shall include one or more of the following components sufficient to achieve no net loss of valley needlegrass grassland acreage: establishment of valley needlegrass grassland within project's open space areas currently characterized by annual grassland, establishment of valley needlegrass grassland off-site, or preservation and enhancement of existing valley needlegrass grassland either on or off the SPA. The applicant(s) shall compensate for any loss of valley needlegrass grassland resulting from project implementation at a minimum 1:1 replacement ratio.	Before approval of grading or improvement plans or any ground-disturbing activities, including grubbing or clearing, for any project phase.	Project applicant(s) for any particular discretionary development application affecting valley needlegrassland.	1. California Department of Fish and Game, 2. City of Folsom Community Development Department.	
Mitigation Measure 3A.3-5: Conduct Tree Survey, Prepare and Implement an Oak Woodland Mitigation Plan, Replace Native Oak Trees Removed, and Implement Measures to Avoid and Minimize Indirect Impacts on Oak Trees Retained On Site. The project applicant(s) shall prepare an oak woodland mitigation and monitoring plan. The project applicant(s) of all on- and off-site project phases containing oak woodland habitat or individual trees shall adhere to the requirements described below, which are consistent with those outlined in California Public Resources Code 21083.4. Pursuant to Sacramento County General Plan policy, the acreage of oak woodland habitat for determining impacts and mitigation requirements was calculated as the oak tree canopy area within stands of oak trees having greater than 10% cover plus a 30-foot-radius buffer measured from the outer edge of the tree canopy. Oak trees located in areas greater than 30 feet from stands meeting the greater than 10% tree canopy cover criterion were considered isolated trees and not part of the blue oak woodland community. Mitigation for impacts on isolated oak trees is discussed separately below. ► Preserve approximately 399 acres of existing oak woodland habitat in the SPA (this acreage is based on the extent of oak woodland habitat as determined from aerial photograph interpretation; however, following completion of ground verification by a qualified arborist, the actual amount of oak woodland present within impact areas could be slightly greater or lesser than the amount calculated from aerial photograph and, therefore, the amount preserved could also be slightly greater or lesser than 399 acres). ► Create 243 acres of oak woodland habitat in the SPA by planting a combination of blue oak acorns, seedlings, and trees in the following SPA locations: • Non-wooded areas that are adjacent to or contiguous with the existing oak woodland habitat. • Preserve and passive open space zones throughout the SPA. • Open space areas that are adjacent to existing oak woodlands that will be impacted by project grading (i.e. catch slopes). • Other practical locations within the SPA in or adjacent to open space. **Oak Woodlands Mitigation Planting Criteria** The following oak woodland mitigation planting criteria shall be used to create oak woodland habitat: • A minimum of 55 planting sites per acre (with a total of 70 units, as defined below) will mitigate for one acre of oak woodland impacts. A combination of acorns, seedlings, and various sizes of container trees (#1 container, #5 container, #15 container) or transplanted trees shall be incorporated into the planting design. Mitigation acreage that is planted solely with larger oak trees (no acorns) shall have a minimum of 35 planting sites per acre. The units are defined as follows: - One established acorn equals one unit (acorns will be over planted to maximize potential germination). - One oak seedling equals one unit. - One #1 container oak tree equals two units. - One #5 container oak tree equals three units. - One #15 container oak tree equals four units. - One 24-inch boxed oak tree equals six units. - One transplanted oak tree equals four units per trunk diameter inch (dbh).	Before approval of grading or improvement plans or any ground disturbing activities, including grubbing or clearing, for any project phase containing protected trees or oak woodland.	Project applicant(s) of all project phases and off-site elements affecting blue oak woodland and protected trees.	1. City of Folsom Community Development Department. 2. Caltrans for interchange improvements to U.S. 50.	

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- Native non oak species characteristic of oak woodlands shall be included in the mitigation planting plan to augment overall habitat values. Each non oak tree species shall represent unit values described above for oak trees, but non oak species shall comprise no more than 10% of the mitigation plantings. ▸ Preserve and protect existing off-site oak woodland habitat. Existing, unprotected oak woodland habitat within Sacramento and El Dorado Counties may be secured and placed under conservation easement in lieu of onsite mitigation measures if necessary. The off-site locations would be managed as oak woodland habitat in perpetuity. ▸ Create oak woodlands off site. Plant a combination of blue oak acorns, seedlings, and trees at off-site location(s), if needed to achieve the creation goal of 243 acres of new blue oak woodland habitat. This measure would only be needed if 243 acres of blue oak woodland could not be created in the SPA. Off-site creation shall follow the same guidelines as outlined in the Mitigation Planting Criteria for on-site creation. Off-site tree planting shall occur at sites within Sacramento County that should naturally support blue oak woodland and shall be used to restore former blue oak woodland habitat that has been degraded or removed through human activities. Restoration shall be designed to result in species composition and densities similar to those in the SPA prior to project development. Planted areas shall be placed under conservation easement and managed as oak woodland habitat in perpetuity. ▸ The oak woodland mitigation plan prepared by the project applicant(s) shall include a maintenance and monitoring program for any replacement trees. The program shall include monitoring and reporting requirements, schedule, and success criteria. Replacement oak trees shall be maintained and monitored for a minimum of eight years from the date of planting and irrigation shall be provided to planted trees for the first five years after planting. Any replacement trees that die during the monitoring period shall be replaced in sufficient numbers to achieve 80% survival rate for planted trees by the end of the eight-year maintenance and monitoring period. Dead and dying trees shall be replaced and monitoring continued until 80% survivorship is achieved. Security acceptable to the City and sufficient to cover maintenance and monitoring costs for eight years shall be provided to the City Planning Department. The security will be forfeited if the project applicant or designated responsible party fails to provide maintenance and monitoring and meet the success criteria. **Isolated Oak Tree Mitigation** The project applicant(s) of all on-site project phases containing oak woodland habitat or isolated trees and the off-site Prairie City Road and Oak Avenue interchange improvements to U.S. 50; Rowberry Drive Overcrossing; and the underground sewer force main shall develop a map depicting the tree canopy of all oak trees in the survey area and identifying the acreage of tree canopy that would be preserved and the acreage that would be removed. A tree permit for removal of isolated oak trees (those not located within the delineated boundary of oak woodland habitat) shall be obtained from the City Planning Director. As a condition of the tree removal permit, project applicant(s) shall be required to develop a Planting and Maintenance Agreement. The City's Tree Preservation Code requires compensatory mitigation and the City and the project applicants have developed a plan, as set forth Section 10 of the Folsom Plan Area Specific Plan (attached to this EIR/EIS as Appendix N) specifically to avoid and minimize adverse effects on isolated oak trees from project development and to provide compensatory mitigation for removal of protected trees in the SPA. In addition to the language contained in the Folsom Plan Area Specific Plan, the following elements shall be included in a protected tree mitigation plan to be developed by the project applicants and agreed upon by the City: ▸ Project applicant(s) of projects containing isolated oak trees shall retain a certified arborist or registered professional forester to perform a determinate survey of tree species, size (dbh), condition, and location for all areas of the project site proposed for tree removal and encroachment of development. The condition of individual trees shall be assessed according to the American Society of Consulting Arborists rating system with the following added explanations: • 5 = Excellent; No problems – tree has no structural problems, branches are properly spaced and tree characteristics are nearly perfect for the species. • 4 = Good; No apparent problems – tree is in good condition and no apparent problems from visual inspection. If potential structural or health problems are tended at this stage, future hazard can be reduced and more serious health problems can be averted. • 3 = Fair; Minor problems – There are some minor structural or health problems that pose no immediate danger. When the recommended actions in an arborist report are completed correctly the defect(s) can be minimized or eliminated. • 2 = Poor; Major problems – the tree is in poor condition, but the condition could be improved with correct arboricultural work including, but not limited to: pruning, cabling, bracing, bolting, guying, spraying, mistletoe removal, vertical mulching, and fertilization. If the recommended actions are completed correctly, hazard can be reduced and the rating can be elevated to a 3. If no action is taken the tree is considered a liability and should be removed.				

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Mitigation Monitoring and Reporting Plan for the Folsom South of U.S. Highway 50 Specific Plan Project

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- 1 = Hazardous or non correctable condition – the tree is in extremely poor condition and in non-reversible decline. This rating is assigned to a tree that has structural and/or health problems that no amount of tree care work or effort can change. The issues may or may not be considered a dangerous situation. The tree may also be infested with a disease or pest(s) that is non-controllable at this time and is causing an unacceptable risk of spreading the disease or pests(s) to other trees.
- 0 = Dead – the tree has no significant signs of life (dead or very close to being dead).

Isolated Oak Tree Mitigation Planting Criteria

- The determination for whether an isolated tree shall be preserved, removed without compensation, or removed with compensatory mitigation shall be based on the condition and size of the tree as follows:
  - Trees rated 0 or 1 may be removed with no mitigation.
  - Trees rated 2 may be removed at 50% of the normal Folsom Municipal Code mitigation.
  - Trees rated 3, 4, and/or 5 may be removed at the normal Folsom Municipal Code mitigation.
  - Native isolated oaks measuring 24 inches or greater dbh for a single trunk or 40 inches or more for a multi-trunked tree and rated a 3 to5 shall be retained, unless retaining wall(s) higher than 4 feet tall (from bottom of footing to the top of the wall) would be required to protect the tree(s) from mass grading of the SPA properties.
  - Native oaks measuring between 12 and 24 inches dbh and rated a 4 or 5 shall not be removed or mitigated unless wall(s) higher than 4 feet tall (from bottom of footing to the top of the wall) would be required to protect the tree(s) from mass grading of the SPA properties. Trees in this size class but rated 2 or 3 shall not be removed unless unreasonable costs to save the tree(s) (greater than the cost of implementing the isolated oak tree mitigation planting criteria described here) would result.
  - Native oaks measuring 5 inches or greater dbh but less than 12 inches dbh shall not be removed unless unreasonable costs to save the tree(s) (greater than the cost of implementing the isolated oak tree mitigation planting criteria described here) would result.
  - Native oak trees measuring 1 inch or greater dbh but less than 5 incbes dbh may be preserved to receive a Small Tree Preservation Credit (STPC). Any tree that is to be considered for preservation credit shall be evaluated, included in the arborist report, and shall have been found to be rated a 3, 4, or a 5. Credits shall only be accepted if the tree protection zone (TPZ) (i.e., the outer edge of the tree canopy drip line) is protected with fencing in the exact manner that 5 inches dbh and greater trees are protected on a construction site, and the spacing is equal to the proper tree spacing dictated by the Folsom Master Tree List. STPC shall not count if they the tree is in a poor growing space due to its position within the TPZ of another protected tree to be preserved. The City sball accept the preservation of native oak trees in this size class as credit towards the total removed inches based on the following STPC criteria:

Caliper of Tree Preserved	Mitigation Tree Credit Equivalent
1 inch or greater, but less than 2 inches	One #15 container tree or two #5 container trees
2 inches or greater, but less than 3 inches	Two #15 container trees
3 inches or greater, but less than 4 inches	Three #15 container trees
4 inches or greater, but less than 5 inches	Four #15 container trees

- Folsom Municipal Code requires one of the following be planted as compensation for each diameter inch of protected tree removed:
  - half of a 24-inch box tree;
  - one #15 container tree;
  - two #5 container trees; or
  - $150 in-lieu payment or other fee set by City Council Resolution.
- The Planting and Maintenance Agreement shall include a planting plan, planting and irrigation design details, and a weaning schedule for the establishment period. The plan shall include a 5-year establishment period for trees and 8 years for planted acorns with an annual monitoring report that includes corrections needed with proposed work plan, and notice of compliance within 90-days of annual monitoring report. Security in an form acceptable to the City and sufficient to cover maintenance and monitoring costs for eight years shall be provided to the City Planning Department. The security will be forfeited if the project applicant or designated responsible party fails to fulfill the Planting and Maintcnancc Agrccmcnt.
- To avoid and minimize indirect impacts on protected trees to remain on the SPA, the project applicant(s) of all affected projcct phases shall install high visibility fencing outside the outer edge of the drip lines of all trees to be retained on the SPA during project construction. The fencing may be installed around groups or stands of trees or whole wooded areas bust must be installed so that the drip

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lines of all trees are protected. Grading, trenching, equipment or materials storage, parking, paving, irrigation, and landscaping shall be prohibited within the fenced areas (i.e. drip lines of protected trees). If the activities listed cannot be avoided within the drip line of a particular tree, that tree shall be counted as an affected tree and compensatory mitigation shall be provided, or the tree in question shall be monitored for a period of five years and replaced only if the tree appears to be dead or dying within five years of project implementation. Through a combination of the mitigation options presented above along with the proposed on-site preservation of blue oak woodland habitat in the open space areas, the project applicant(s) can satisfy the mitigation requirements for removal of trees protected under the Folsom Municipal Code while also mitigating the impacts on oak woodland habitat, as determined through consultation with the Sacramento County Planning Department (for County off-site impacts only) and/or the City of Folsom. Mitigation for the U.S. 50 interchange improvements must be coordinated by the project applicant(s) of each applicable project phase with Caltrans.				
3B.3 BIOLOGICAL RESOURCES- WATER				
Mitigation Measure 3B.3-1a: Secure Clean Water Act Section 404 Permit and Implement All Permit Conditions; Ensure No Net Loss of Functions of Wetlands, Other Waters of the U.S., and Waters of the State. Before the approval of grading and improvement plans and before any groundbreaking activity associated with the Off-site Water Facilities requiring fill of wetlands or other waters of the U.S. or waters of the state, the City shall obtain all necessary permits under Sections 401 and 404 of the CWA or the state's Porter-Cologne Water Quality Control Act for the respective phase. For each respective Off-site Water Facility component, all permits, regulatory approvals, and permit conditions for effects on wetland habitats shall be secured before implementation of any grading activities within 250 feet of waters of the U.S. or wetland habitats, including waters of the state, that potentially support Federally listed species. The City shall commit to replace, restore, or enhance on a "no net loss" basis (in accordance with USACE and the Central Valley RWQCB) the acreage of all wetlands and other waters of the U.S. that would be removed, lost, and/or degraded with implementation of project plans for that phase. Wetland habitat shall be restored, enhanced, and/or replaced at an acreage and location and by methods agreeable to USACE, the Central Valley RWQCB, and the City, as appropriate, depending on agency jurisdiction, and as determined during the Section 401 and Section 404 permitting processes. As part of the Section 404 permitting process, a draft wetland mitigation and monitoring plan (MMP) shall be developed for the selected Off-site Water Facility Alternative on behalf of the City. Before any ground-disturbing activities that would adversely affect wetlands and before engaging in mitigation activities associated with each phase of development, the City shall submit the draft wetland MMP to USACE and the Central Valley RWQCB for review and approval of those portions of the plan over which they have jurisdiction. The MMP would have to be approved prior to issuance of a Section 404 permit. Once the final MMP is approved and implemented, mitigation monitoring shall continue for a minimum of 5 years from completion of mitigation, or human intervention (including recontouring and grading), or until the performance standards identified in the approved MMP have been met, whichever is longer. As part of the MMP, the City shall prepare and submit plans for the creation of aquatic habitat in order to adequately offset and replace the aquatic functions and services that would be lost, account for the temporal loss of habitat, and contain an adequate margin of safety to reflect anticipated success. Restoration of previously altered and degraded wetlands shall be a priority of the MMP for offsetting losses of aquatic functions on the project site because it is typically easier to achieve functional success in restored wetlands than in those created from uplands. The MMP must demonstrate how the aquatic functions and values that would be lost through project implementation will be replaced. The habitat MMP for jurisdictional wetland features shall be consistent with USACE's and EPA's April 10, 2008 Final Rule for Compensatory Mitigation for Losses of Aquatic Resources (33 CFR Parts 325 and 332 and 40 CFR Part 230). According to the Final Rule, mitigation banks should be given preference over other types of mitigation because a lot of the risk and uncertainty regarding mitigation success is alleviated by the fact that mitigation bank wetlands must be established and demonstrating functionality before credits can be sold. This also alleviates temporal losses of wetland function while compensatory wetlands are being established. Mitigation banks also tend to be on larger, more ecologically valuable parcels and are subjected to more rigorous scientific study and planning and implementation procedures than typical permittee-responsible mitigation sites (USACE and EPA 2008). It is not likely feasible to provide compensatory mitigation for all aquatic resource impacts on site. Therefore, a combination of on-site and off-site permittee-responsible mitigation and mitigation banking would likely be necessary to achieve the no-net-loss standard. Compensatory mitigation for losses of stream and intermittent drainage channels shall be achieved through in-kind preservation, restoration, or enhancement, as specified in the Final Rule guidelines. The wetland MMP shall address how to mitigate impacts on all aquatic resource types and shall describe specific method(s) to be implemented to avoid and/or mitigate any Off-site Water Facility-related impacts. The	Before the approval of grading or improvement plans or any ground-disturbing activities for all the Off-site Water Facilities containing wetland features or other waters of the U.S. The MMP must be approved before any impact on wetlands can occur. Mitigation shall be implemented on an ongoing basis throughout and after construction, as required.	City of Folsom Utilities Department	U.S. Army Corps of Engineers, Regional Water Quality Control Board, California Department of Fish and Game.	

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wetland compensation section of the habitat MMP shall include all the contents identified in Mitigation Measure 3A.3-1A. USACE has determined that the Off-site Water Facilities may require an individual permit. In its final stage and once approved by USACE, the MMP for the Off-site Water Facilities is expected to detail proposed wetland restoration, enhancement, and/or replacement activities that would ensure no net loss of aquatic functions in the project vicinity. Approval and implementation of the wetland MMP shall aim to fully mitigate all unavoidable impacts on jurisdictional waters of the U.S., including jurisdictional wetlands. To satisfy the requirements of the City and the Central Valley RWQCB, mitigation of impacts on the non-jurisdictional wetlands beyond the jurisdiction of USACE shall be included in the same MMP. All mitigation requirements determined through this process shall be implemented before grading plans are approved. The MMP shall be submitted to USACE and approved prior to the issuance of any permits under Section 404 of the CWA. Water quality certification pursuant to Section 401 of the CWA will be required before issuance of the Section 404 permit. Before construction in any areas containing wetland features, the City shall obtain water quality certification for the Off-site Water Facilities. Any measures required as part of the issuance of water quality certification shall be implemented.				
Mitigation Measure 3B.3-1b: Maximum Use of Trenchless Technology for Conveyance Pipeline Design. Following the selection of a Off-site Water Facility Alternative, the City shall design and route the water conveyance pipeline to avoid waters of the U.S and State, including wetlands and vernal pools, to the maximize extent practical. Where avoidance is not practical, the City shall maximize the use of trenchless technologies (micro-tunneling or jack-and-bore), where feasible. All trenchless construction crossings will include the preparation of a Frac-Out (or inadvertent return of drilling lubricants) Contingency Plan for tunneling activities that use drilling lubricants (e.g., construction of pipelines using jack-and-bore methods). The purpose of the plan will be to minimize the potential for a frac-out associated with tunneling activities, provide for the timely detection of frac-outs, and ensure an organized, timely, and "minimum-impact" response in the event of a frac-out and release of drilling lubricant (i.e., bentonite). Preparation and implementation of a Frac-Out Contingency Plan will be reflected in contract documents.	Prior to and during construction of all Off-Site Water Facilities	City of Folsom Utilities Department	U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Regional Water Quality Control Board, California Department of Fish and Game.	
Mitigation Measure 3B.3-1c: Restore All Waters Impacted by Trenching and Temporary Construction Staging Areas to Pre-Project Contours and Conditions. For all water line crossings of waters of the U.S. or State in which the use of trenchless technologies are not feasible, the City shall ensure that all waters impacted by trenching activities are restored to pre-project contours and conditions. In addition, within 30 days following project construction, the City shall ensure that all temporary construction staging areas within waters of the U.S. or State are restored to pre-project contours and conditions. At minimum, the City shall ensure that the following measures are implemented during construction: ► Conduct trenching and construction activities across drainages during low-flow (e.g., <1 to 2 cfs) or dry periods as feasible; ► If working in active channels, install cofferdam upstream and downstream of stream crossing to separate construction area from flowing waterway; ► Place sediment curtains upstream and downstream of the construction zone to prevent sediment disturbed during trenching activities from being transported and deposited outside of the construction zone; ► Locate spoil sites such that they do not drain directly into the drainages or seasonal wetlands; ► Store equipment and materials away from the drainages and wetland areas. No debris will be deposited within 250 feet of the drainages and wetland areas; ► Prepare and implement a revegetation plan to restore vegetation in all temporarily disturbed wetlands and other waters using native species seed mixes and container plant material that are appropriate for existing hydrological conditions. Before the approval of grading and improvement plans and before any groundbreaking activity associated with the Off-site Water Facilities requiring fill of wetlands or other waters of the U.S. or waters of the state, the City shall submit a wetland mitigation and monitoring plan (MMP) for the restoration of these waters within the selected water alignment to the USACE and Central Valley RWQCB for review and approval of those portions of the plan over which they have jurisdiction. The MMP would have to be approved prior to issuance of a Section 404 permit. Once the final MMP is approved and implemented, mitigation monitoring shall continue for a minimum of 5 years from completion of restoration activities, or human intervention (including recontouring and grading), or until the performance standards identified in the approved MMP have been met, whichever is longer. At minimum, the MMP shall provide the following information: ► A description and drawings showing the existing contours (elevation) and existing vegetation of the waters of the U.S. and State that would be impacted through trenching activities. This information shall include site photographs taken at each impacted water.	Before the approval of grading or improvement plans or any ground-disturbing activities for all the Off-site Water Facilities containing wetland features or other waters of the U.S.	City of Folsom Utilities Department	1. U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Regional Water Quality Control Board, California Department of Fish and Game. 2. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 3. For improvements within Sacramento County or City of Rancho Cordova: Sacramento County Planning and Community Development Department or City of Rancho Cordova Planning Department.	

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► Methods used to ensure that trenching within waters of the U.S. and State do not adversely alter existing hydrology, including the draining of the waters (e.g., use of cut-off walls). ► The methods used to restore the site to the original contour and condition, as well as a plan for the revegetation of the site following installation of the water line. ► Proposed schedule for restoration activities				
Mitigation Measure 3B.3-2: Conduct Preconstruction Survey for Western Spadefoot Toad and Northwestern Pond Turtle and if Found, Implement Avoidance and Compensation Measures. Prior to construction, a qualified biologist retained by the City shall conduct protocol-level surveys for the western spadefoot toad and northwestern pond turtle to determine if these species are currently using water features crossed by the selected alignment. If either of these species is detected, then the City shall consult with the DFG (and USFWS if appropriate) to develop additional minimization measures prior to project construction (if necessary). These additional measures may include timing restrictions for groundwater dewatering activities, construction monitoring, and long-term monitoring. If temporary fencing is used, it shall take the form of silt fencing and temporary plastic construction fencing placed no closer than 25 feet from the edge of the protected habitat. Protective fencing around vernal pools identified as potential habitat for special-status species shall be constructed in a way that allows western spadefoot toad to access these wetlands. Impacted western spadefoot toad habitat shall be mitigated and compensated in accordance with USFWS and DFG requirements.	Prior to and during construction of all Off-site Water Facilities	City of Folsom Utilities Department	1. U.S. Fish and Wildlife Service, California Department of Fish and Game. 2. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 3. For improvements within Sacramento County or City of Rancho Cordova: Sacramento County Planning and Community Development Department or City of Rancho Cordova Planning Department.	
3A.4 CLIMATE CHANGE – LAND				
Mitigation Measure 3A.4-1: Implement Additional Measures to Control Construction-Generated GHG Emissions. To further reduce construction-generated GHG emissions, the project applicant(s) any particular discretionary development application shall implement all feasible measures for reducing GHG emissions associated with construction that are recommended by SMAQMD at the time individual portions of the site undergo construction. Such measures may reduce GHG exhaust emissions from the use of on-site equipment, worker commute trips, and truck trips carrying materials and equipment to and from the SPA, as well as GHG emissions embodied in the materials selected for construction (e.g., concrete). Other measures may pertain to the materials used in construction. Prior to releasing each request for bid to contractors for the construction of each discretionary development entitlement, the project applicant(s) shall obtain the most current list of GHG reduction measures that are recommended by SMAQMD and stipulate that these measures be implemented in the respective request for bid as well as the subsequent construction contract with the selected primary contractor. The project applicant(s) for any particular discretionary development application may submit to the City and SMAQMD a report that substantiates why specific measures are considered infeasible for construction of that particular development phase and/or at that point in time. The report, including the substantiation for not implementing particular GHG reduction measures, shall be approved by the City, in consultation with SMAQMD prior to the release of a request for bid by the project applicant(s) for seeking a primary contractor to manage the construction of each development project. By requiring that the list of feasible measures be established prior to the selection of a primary contractor, this measure requires that the ability of a contractor to effectively implement the selected GHG reduction measures be inherent to the selection process. SMAQMD's recommended measures for reducing construction-related GHG emissions at the time of writing this EIR/EIS are listed below and the project applicant(s) shall, at a minimum, be required to implement the following: ► Improve fuel efficiency from construction equipment: • reduce unnecessary idling (modify work practices, install auxiliary power for driver comfort); • perform equipment maintenance (inspections, detect failures early, corrections); • train equipment operators in proper use of equipment; • use the proper size of equipment for the job; and	Before approval of small-lot final maps and building permits for all discretionary development project, including all on- and off-site elements and implementation throughout project construction.	Project applicant(s) during all discretionary development project phases and on-site and off-site elements.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For all on- and off-site project-related activities within the City of Folsom and Sacramento County. 3. For the two roadway extensions into El Dorado Hills: El Dorado County Development Services Department.	

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• use equipment with new technologies (repowered engines, electric drive trains). ▸ Use alternative fuels for electricity generators and welders at construction sites such as propane or solar, or use electrical power. ▸ Use an ARB-approved low-carbon fuel, such as biodiesel or renewable diesel for construction equipment. (Emissions of oxides of nitrogen [NO_X] emissions from the use of low carbon fuel must be reviewed and increases mitigated.) Additional information about low-carbon fuels is available from ARB's Low Carbon Fuel Standard Program (ARB 2009b). ▸ Encourage and provide carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes. ▸ Reduce electricity use in the construction office by using compact fluorescent bulbs, powering off computers every day, and replacing heating and cooling units with more efficient ones. ▸ Recycle or salvage non-hazardous construction and demolition debris (goal of at least 75% by weight). ▸ Use locally sourced or recycled materials for construction materials (goal of at least 20% based on costs for building materials, and based on volume for roadway, parking lot, sidewalk and curb materials). ▸ Minimize the amount of concrete used for paved surfaces or use a low carbon concrete option. ▸ Produce concrete on-site if determined to be less emissive than transporting ready mix. ▸ Use EPA-certified SmartWay trucks for deliveries and equipment transport. Additional information about the SmartWay Transport Partnership Program is available from ARB's Heavy-Duty Vehicle Greenhouse Gas Measure (ARB 2009c) and EPA (EPA 2009). ▸ Develop a plan in consultation with SMAQMD to efficiently use water for adequate dust control. This may consist of the use of non-potable water from a local source. In addition to SMAQMD-recommended measures, construction activity shall comply with all applicable rules and regulations established by SMAQMD and ARB.				
Mitigation Measure 3A.4-2a: Implement Additional Measures to Reduce Operational GHG Emissions. Each increment of new development within the project site requiring a discretionary approval (e.g., proposed tentative subdivision map, conditional use permit), shall be subject to a project-specific environmental review (which could support an applicable exemption, negative or mitigated negative declaration or project-specific EIR) and will require that GHG emissions from operation of each phase of development, including supporting roadway and infrastructure improvements that are part of the selected action alternative, will be reduced by an amount sufficient to achieve the 2020-based threshold of significance of 4.36 CO_2e/SP/year for development that would become operational on or before the year 2020, and the 2030-based threshold of significance of 2.86 CO2e/SP/year for development that would become operational on or before the year 2030. The above-stated thresholds of significance may be subject to change if SMAQMD approves its own GHG significance thresholds, in which case, SMAQMD-adopted thresholds will be used. The amount of GHG reduction required to achieve the applicable significance thresholds will furthermore depend on existing and future regulatory measures including those developed under AB 32). For each increment of new discretionary development, the City shall submit to the project applicant(s) a list of potentially feasible GHG reduction measures to be considered in the development design. The City's list of potentially feasible GHG reduction measures shall reflect the current state of the regulatory environment, available incentives, and thresholds of significance that may be developed by SMAQMD, which will evolve under the mandate of AB 32 and Executive Order S-3-05. If the project applicant(s) asserts it cannot meet the 2020-based goal, then the report shall also demonstrate why measures not selected are considered infeasible. The City shall review and ensure inclusion of the design features in the proposed project before applicant(s) can receive the City's discretionary approval for the any increment of development. In determining what measures should appropriately be imposed by the City under the circumstances, the City shall consider the following factors: ▸ the extent to which rates of GHG emissions generated by motor vehicles traveling to, from, and within the SPA are projected to decrease over time as a result of regulations, policies, and/or plans that have already been adopted or may be adopted in the future by ARB or other public agency pursuant to AB 32, or by EPA; ▸ the extent to which mobile-source GHG emissions, which at the time of writing this EIR/EIS comprise a substantial portion of the state's GHG inventory, can also be reduced through design measures that result in trip reductions and reductions in trip length; ▸ the extent to which GHG emissions emitted by the mix of power generation operated by SMUD, the electrical utility that will serve the SPA, are projected to decrease pursuant to the Renewables Portfolio Standard required by SB 1078 and SB 107, as well as any future regulations, policies, and/or plans adopted by the federal and state governments that reduce GHG emissions from power generation;	Before approval of final maps and building permits for all project phases, including all on- and off-site elements.	The project applicant(s) for any particular discretionary development.	City of Folsom Community Development Department.	

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► the extent to which any stationary sources of GHG emissions that would be operated on a proposed land use (e.g., industrial) are already subject to regulations, policies, and/or plans that reduce GHG emissions, particularly any future regulations that will be developed as part of ARB's implementation of AB 32, or other pertinent regulations on stationary sources that have the indirect effect of reducing GHG emissions; ► the extent to which other mitigation measures imposed on the project to reduce other air pollutant emissions may also reduce GHG emissions; ► the extent to which the feasibility of existing GHG reduction technologies may change in the future, and to which innovation in GHG reduction technologies will continue, effecting cost-benefit analyses that determine economic feasibility; and ► whether the total costs of proposed mitigation for GHG emissions, together with other mitigation measures required for the proposed development, are so great that a reasonably prudent property owner would not proceed with the project in the face of such costs. In considering how much, and what kind of, mitigation is necessary in light of these factors, the City shall consider the following list of options, though the list is not intended to be exhaustive, as GHG emission reduction strategies and their respective feasibility are likely to evolve over time. These measures are derived from multiple sources including the Mitigation Measure Summary in Appendix B of the California Air Pollution Control Officer's Association (CAPCOA) white paper, CEQA & Climate Change (CAPCOA 2009a); CAPCOA's Model Policies for Greenhouse Gases in General Plans (CAPCOA 2009b); and the California Attorney General's Office publication, The California Environmental Quality Act: Addressing Global Warming Impacts at the Local Agency Level (California Attorney General's Office 2008). **Energy Efficiency** ► Include clean alternative energy features to promote energy self-sufficiency (e.g., photovoltaic cells, solar thermal electricity systems, small wind turbines). ► Design buildings to meet CEC Tier II requirements (e.g., exceeding the requirements of the Title 24 [as of 2007] by 35%). ► Site buildings to take advantage of shade and prevailing winds and design landscaping and sun screens to reduce energy use. ► Install efficient lighting in all buildings (including residential). Also install lighting control systems, where practical. Use daylight as an integral part of lighting systems in all buildings. ► Install light-colored "cool" pavements, and strategically located shade trees along all bicycle and pedestrian routes. **Water Conservation and Efficiency** ► With the exception of ornamental shade trees, use water-efficient landscapes with native, drought-resistant species in all public area and commercial landscaping. Use water-efficient turf in parks and other turf-dependant spaces. ► Install the infrastructure to use reclaimed water for landscape irrigation and/or washing cars. ► Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls. ► Design buildings and lots to be water-efficient. Only install water-efficient fixtures and appliances. ► Restrict watering methods (e.g., prohibit systems that apply water to nonvegetated surfaces) and control runoff. Prohibit businesses from using pressure washers for cleaning driveways, parking lots, sidewalks, and street surfaces. These restrictions should be included in the Covenants, Conditions, and Restrictions of the community. ► Provide education about water conservation and available programs and incentives. ► To reduce stormwater runoff, which typically bogs down wastewater treatment systems and increases their energy consumption, construct driveways to single-family detached residences and parking lots and driveways of multifamily residential uses with pervious surfaces. Possible designs include Hollywood drives (two concrete strips with vegetation or aggregate in between) and/or the use of porous concrete, porous asphalt, turf blocks, or pervious pavers. **Solid Waste Measures** ► Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard). ► Provide interior and exterior storage areas for recyclables and green waste at all buildings. ► Provide adequate recycling containers in public areas, including parks, school grounds, golf courses, and pedestrian zones in areas of mixed-use development.				

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► Provide education and publicity about reducing waste and available recycling services. **Transportation and Motor Vehicles** ► Promote ride-sharing programs and employment centers (e.g., by designating a certain percentage of parking spaces for ride-sharing vehicles, designating adequate passenger loading and unloading zones and waiting areas for ride-share vehicles, and providing a Web site or message board for coordinating ride-sharing). ► Provide the necessary facilities and infrastructure in all land use types to encourage the use of low- or zero-emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations). ► At industrial and commercial land uses, all forklifts, "yard trucks," or vehicles that are predominately used on-site at non-residential land uses shall be electric-powered or powered by biofuels (such as biodiesel [B100]) that are produced from waste products, or shall use other technologies that do not rely on direct fossil fuel consumption.				
Mitigation Measure 3A.4-2b: Participate in and Implement an Urban and Community Forestry Program and/or Off-Site Tree Program to Off-Set Loss of On-Site Trees. The trees on the project site contain sequestered carbon and would continue to provide future carbon sequestration during their growing life. For all harvestable trees that are subject to removal, the project applicant(s) for any particular discretionary development application shall participate in and provide necessary funding for urban and community forestry program (such as the UrbanWood program managed by the Urban Forest Ecosystems Institute [Urban Forest Ecosystems Institute 2009]) to ensure that wood with an equivalent carbon sequestration value to that of all harvestable removed trees is harvested for an end-use that would retain its carbon sequestration (e.g., furniture building, cabinet making). For all nonharvestable trees that are subject to removal, the project applicant(s) shall develop and fund an off-site tree program that includes a level of tree planting that, at a minimum, increases carbon sequestration by an amount equivalent to what would have been sequestered by the blue oak woodland during its lifetime. This program shall be funded by the project applicant(s) of each development phase and reviewed for comment by an independent Certified Arborist unaffiliated with the project applicant(s) and shall be coordinated with the requirements of Mitigation Measure 3.3-5, as stated in Section 3A.3, "Biological Resources - Land." Final approval of the program shall be provided by the City. Components of the program may include, but not be limited to, providing urban tree canopy in the City of Folsom, or reforestation in suitable areas outside the City. Reforestation in natural habitat areas outside the City of Folsom would simultaneously mitigate the loss of oak woodland habitat while planting trees within the urban forest canopy would not. The California Urban Forestry Greenhouse Gas Reporting Protocol shall be used to assess this mitigation program (CCAR 2008). All unused vegetation and tree material shall be mulched for use in landscaping on the project site, shipped to the nearest composting facility, or shipped to a landfill that is equipped with a methane collection system, or combusted in a biomass power plant. Tree and vegetative material should not be burned on- or off-site unless used as fuel in a biomass power plant.	Before approval of final maps and/or building permits for all project phases requiring discretionary approval, including all on- and off-site elements.	The project applicant(s) for any particular discretionary development application.	The City of Folsom Community Development Department.	
3B.4 CLIMATE CHANGE – WATER				
Mitigation Measure 3B.4-1a: Implement GHG Reduction Measures during Construction. The bid specifications for construction of the Off-site Water Facilities shall require that bidders demonstrate how they will comply with each of the following measures during all construction and demolition activities: 1) Construction vehicles and equipment will be properly maintained at all times in accordance with manufacturer's specifications, including proper tuning and timing of engines. Equipment maintenance records and equipment design specification data sheets shall be kept on-site during construction and demolition activities and subject to inspection by the SMAQMD. 2) Operators will turn off all construction vehicles and equipment and all delivery vehicles when not in use, and not allow idling for more than 5 minutes or for such other more restrictive time as may be required in law or regulation. 3) On-site construction vehicles and equipment will use ARB-certified biodiesel fuel if available (a minimum of B20, or 20 percent of biodiesel) except for those with warranties that would be voided if B20 biodiesel fuel were used. Prior to issuance of grading or demolition permits, the contractor shall provide documentation to the City that verifies whether any equipment is exempt; that a biodiesel supply has been secured; and that the construction contractor is aware that the use of biodiesel is required. 4) A City-approved Solid Waste Diversion and Recycling Plan (or such other documentation to the satisfaction of the City) will be in place for the Off-site Water Facilities that demonstrates the diversion from landfills and recycling of all nonhazardous, salvageable and re-useable wood, metal, plastic and paper products during construction and demolition activities. The Plan or other documentation shall include the name of the waste hauler, their assumed destination for all waste and recycled materials, and the procedures that will be followed to ensure implementation of this measure.	Prior to the approval of grading plans and building permits for all off-site water facilities.	City of Folsom Utilities Department	1. For improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department, City of Folsom Community Development Department and SMAQMD. 2. For improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department and SMAQMD. 3. For improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
			Planning Department and SMAQMD.	
Mitigation Measure 3B.4-1b Prepare and Implement an Off-site Water Facilities Climate Action Plan. Prior to operation, the City shall have in place a Off-site Water Facilities Climate Action Plan and Greenhouse Reduction Strategy (Plan) that has been adopted by the City following an opportunity for review and recommendation by the SMAQMD. At a minimum, the Plan shall include: ▸ Designation of Person Responsible for Implementation. The Plan shall designate the name and contact information of the person(s) responsible for ensuring continuous and on-going implementation of the Plan. ▸ GHG Inventory and Reduction Target. The City shall prepare a complete GHG Inventory for the Offsite Water Facilities components within one year following occupancy and a GHG reduction target based on State guidance. ▸ Off-site Water Facilities Design Features. The Off-site Water Facilities shall include design features to reduce operational GHG emissions, as well as an estimate of the reduction in GHG emissions that is expected to result from each facility. Initial measures that may be considered include, but are not limited to: • design all conditioned occupancies with "cool roofs" using products certified by the Cool Roof Rating Council, and other exposed roof surfaces coated with "cool paints"; • design all conditioned occupancies to take advantage of shade through the planting of deciduous canopy-type trees and/or prevailing winds to reduce energy use; • make maximum use of EnergyStar-qualified energy efficient appliances, heating and cooling systems, office equipment and lighting products; • install a photovoltaic array (solar panels) or other source of renewable energy generation on-site, or otherwise acquire energy that has been generated by renewable sources to meet a portion of the electricity needs of the Offsite Water Facilities; and • in an effort to reduce GHG emissions from transportation sources, the bid specifications for the Offsite Water Facilities should require that bidders demonstrate that they have given preference to local sources of building materials or offer evidence to support why such local sources have not been used.	Prior to the approval of grading plans and building permits for all off-site water facilities.	City of Folsom Utilities Department	1. For improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department, City of Folsom Community Development Department and SMAQMD. 2. For improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department and SMAQMD. 3. For improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department and SMAQMD.	
3A.5 CULTURAL RESOURCES – LAND				
Mitigation Measure 3A.5-1a: Comply with the Programmatic Agreement. The PA for the proposed project is incorporated by reference. The PA provides a management framework for identifying historic properties, determining adverse effects, and resolving those adverse effects as required under Section 106 of the NHPA. This document is incorporated by reference. The PA is available for public inspection and review at the California Office of Historic Preservation 1725 23rd Street Sacramento, CA 95816.	The PA shall be prepared and executed (signed) prior to issuance of any Federal permit or authorization for any aspect or component of the specific plan project.	USACE (or designee) and the project applicant(s) of all project phases (as directed by USACE)	USACE and the project applicant(s) of all project phases (as directed by USACE), with oversight by the SHPO.	
Mitigation Measure 3A.5-1b: Perform an Inventory and Evaluation of Cultural Resources for the California Register of Historic Places, Minimize or Avoid Damage or Destruction, and Perform Treatment Where Damage or Destruction Cannot be Avoided. Management of cultural resources eligible for or listed on the CRHR under CEQA mirrors management steps required under Section 106. These steps may be combined with deliverables and management steps performed for Section 106 provided that management documents prepared for the PA also clearly reference the CRHR listing criteria and significance thresholds that apply under CEQA. Prior to ground-disturbing work for each individual development phase or off-site element, the applicable oversight agency (City of Folsom, El Dorado County, Sacramento County, or Caltrans), or the project applicant(s) of all project phases, with applicable agency oversight, shall perform the following actions: ▸ Retain the services of a qualified archaeologist to perform an inventory of cultural resources within each individual development phase or off-site element subject to approval under CEQA. Identified resources shall be evaluated for listing on the CRHR. The inventory report shall also identify locations that are sensitive for undiscovered cultural resources based upon the location of known resources, geomorphology, and topography. The inventory report shall specify the location of monitoring of ground-disturbing work in these areas by a qualified archaeologist, and monitoring in the vicinity of identified resources that may be damaged by construction, if appropriate. The identification of sensitive locations subject to monitoring during construction of each individual development phase shall be performed in concert with monitoring activities performed under the PA to minimize the potential for conflicting requirements.	Before issuance of building permits and ground-disturbing activities.	The applicable oversight agency and the project applicant(s) (at the agency's direction) of all project phases.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the two roadway connections in El Dorado Hills: El Dorado County Development Services Department. 3. For the detention basin west of Prairie City Road: Sacramento County Planning and Community	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
▸ For each resource that is determined eligible for the CRHR, the applicable agency or the project applicant(s) for any particular discretionary development (under the agency's direction) shall obtain the services of a qualified archaeologist who shall determine if implementation of the individual project development would result in damage or destruction of "significant" (under CEQA) cultural resources. These findings shall be reviewed by the applicable agency for consistency with the significance thresholds and treatment measures provided in this EIR/EIS. ▸ Where possible, the project shall be configured or redesigned to avoid impacts on eligible or listed resources. Alternatively, these resources may be preserved in place if possible, as suggested under California Public Resources Code Section 21083.2. Avoidance of historic properties is required under certain circumstances under the Public Resource Code and 36 CFR Part 800. ▸ Where impacts cannot be avoided, the applicable agency or the project applicant(s) of all project phases (under the applicable agency's direction) shall prepare and implement treatment measures that are determined to be necessary by a qualified archaeologist. These measures may consist of data recovery excavations for resources that are eligible for listing because of the data they contain (which may contribute to research). Alternatively, for historical architectural, engineered, or landscape features, treatment measures may consist of a preparation of interpretive, narrative, or photographic documentation. These measures shall be reviewed by the applicable oversight agency for consistency with the significance thresholds and standards provided in this EIR/EIS. ▸ To support the evaluation and treatment required under this mitigation measure, the archaeologist retained by either the applicable oversight agency or the project applicant(s) of all project phases shall prepare an appropriate prehistoric and historic context that identifies relevant prehistoric, ethnographic, and historic themes and research questions against which to determine the significance of identified resources and appropriate treatment. ▸ These steps and documents may be combined with the phasing of management and documents prepared pursuant to the PA to minimize the potential for inconsistency and duplicative management efforts. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., El Dorado and/or Sacramento Counties, or Caltrans).			Development Department. 4. For the U.S. 50 interchange improvements: Caltrans.	
Mitigation Measure 3A.5-2: Conduct Construction Personnel Education, Conduct On-Site Monitoring if Required, Stop Work if Cultural Resources are Discovered, Assess the Significance of the Find, and Perform Treatment or Avoidance as Required. To reduce potential impacts to previously undiscovered cultural resources, the project applicant(s) of all project phases shall do the following: ▸ Before the start of ground-disturbing activities, the project applicant(s) of all project phases shall retain a qualified archaeologist to conduct training for construction workers as necessary based upon the sensitivity of the project APE, to educate them about the possibility of encountering buried cultural resources, and inform them of the proper procedures should cultural resources be encountered. ▸ As a result of the work conducted for Mitigation Measures 3A.5-1a and 3A.5-1b, if the archaeologist determines that any portion of the SPA or the off-site elements should be monitored for potential discovery of as-yet-unknown cultural resources, the project applicant(s) of all project phases shall implement such monitoring in the locations specified by the archaeologist. USACE should review and approve any recommendations by archaeologists with respect to monitoring. ▸ Should any cultural resources, such as structural features, unusual amounts of bone or shell, artifacts, or architectural remains be encountered during any construction activities, work shall be suspended in the vicinity of the find and the appropriate oversight agency(ies) (identified below) shall be notified immediately. The appropriate oversight agency(ies) shall retain a qualified archaeologist who shall conduct a field investigation of the specific site and shall assess the significance of the find by evaluating the resource for eligibility for listing on the CRHR and the NRHP. If the resource is eligible for listing on the CRHR or NRHP and it would be subject to disturbance or destruction, the actions required in Mitigation Measures 3A.5-1a and 3A.5-1b shall be implemented. The oversight agency shall be responsible for approval of recommended mitigation if it is determined to be feasible in light of the approved land uses, and shall implement the approved mitigation before resuming construction activities at the archaeological site. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., El Dorado and/or Sacramento Counties, or Caltrans).	Before and during ground-disturbing activities.	Project applicant(s) of all project phases.	1. For actions taken to satisfy the requirements of Section 106: the SHPO and USACE. 2. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 3. For the two roadway connections off-site into El Dorado Hills: El Dorado County Development Services Department. 4. For the detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department. 5. For the U.S. 50 interchange improvements: Caltrans.	
Mitigation Measure 3A.5-3: Suspend Ground-Disturbing Activities if Human Remains are Encountered and Comply with California Health and Safety Code Procedures. In accordance with the California Health and Safety Code, if human remains are uncovered during ground-disturbing activities, including those associated with off-site elements, the project applicant(s) of all project phases shall immediately halt all ground-disturbing activities in the area of the find and notify the applicable county coroner and a professional archaeologist skilled in osteological analysis to determine the nature of the remains. The coroner is required to examine all discoverics of human remains within 48	Upon the discovery of suspected human remains.	Project applicant(s) of all project phases.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
hours of receiving notice of a discovery on private or public lands (California Health and Safety Code Section 7050.5[b]). If the coroner determines that the remains are those of a Native American, he or she must contact the NAHC by phone within 24 hours of making that determination (California Health and Safety Code Section 7050[c]). After the coroner's findings are complete, the project applicant(s), an archaeologist, and the NAHC-designated MLD shall determine the ultimate treatment and disposition of the remains and take appropriate steps to ensure that additional human interments are not disturbed. The responsibilities for acting on notification of a discovery of Native American human remains are identified in Section 5097.9 of the California Public Resources Code. Upon the discovery of Native American remains, the procedures above regarding involvement of the applicable county coroner, notification of the NAHC, and identification of an MLD shall be followed. The project applicant(s) of all project phases shall ensure that the immediate vicinity (according to generally accepted cultural or archaeological standards and practices) is not damaged or disturbed by further development activity until consultation with the MLD has taken place. The MLD shall have at least 48 hours after being granted access to the site to inspect the site and make recommendations. A range of possible treatments for the remains may be discussed: nondestructive removal and analysis, preservation in place, relinquishment of the remains and associated items to the descendants, or other culturally appropriate treatment. As suggested by Assembly Bill (AB) 2641 (Chapter 863, Statutes of 2006), the concerned parties may extend discussions beyond the initial 48 hours to allow for the discovery of additional remains. AB 2641(e) includes a list of site protection measures and states that the project applicant(s) shall comply with one or more of the following requirements: ▸ record the site with the NAHC or the appropriate Information Center, ▸ use an open-space or conservation zoning designation or easement, or ▸ record a document with the county in which the property is located. The project applicant(s) or its authorized representative of all project phases shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance if the NAHC is unable to identify an MLD or if the MLD fails to make a recommendation within 48 hours after being granted access to the site. The project applicant(s) or its authorized representative may also reinter the remains in a location not subject to further disturbance if it rejects the recommendation of the MLD and mediation by the NAHC fails to provide measures acceptable to the landowner. Ground disturbance in the zone of suspended activity shall not recommence without authorization from the archaeologist. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., El Dorado and/or Sacramento Counties, or Caltrans).			Department. 2. For the two roadway connections in El Dorado Hills: El Dorado County Development Services Department. 3. For the detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department. 4. For the U.S. 50 interchange improvements: Caltrans.	
3A.7 GEOLOGY, SOILS, MINERALS, AND PALEONTOLOGICAL RESOURCES - LAND				
Mitigation Measure 3A.7-1a: Prepare Site-Specific Geotechnical Report per CBC Requirements and Implement Appropriate Recommendations. Before building permits are issued and construction activities begin any project development phase, the project applicant(s) of each project phase shall hire a licensed geotechnical engineer to prepare a final geotechnical subsurface investigation report for the on- and off-site facilities, which shall be submitted for review and approval to the appropriate City or county department (identified below). The final geotechnical engineering report shall address and make recommendations on the following: ▸ site preparation; ▸ soil bearing capacity; ▸ appropriate sources and types of fill; ▸ potential need for soil amendments; ▸ road, pavement, and parking areas; ▸ structural foundations, including retaining-wall design; ▸ grading practices; ▸ soil corrosion of concrete and steel; ▸ erosion/winterization; ▸ seismic ground shaking; ▸ liquefaction; and ▸ expansive/unstable soils. In addition to the recommendations for the conditions listed above, the geotechnical investigation shall include subsurface testing of soil and groundwater conditions, and shall determine appropriate foundation designs that are consistent with the version of the CBC that is applicable at the time building and grading permits are applied for. All recommendations contained in the final geotechnical engineering report shall be implemented by the project applicant(s) of each project phase. Special recommendations contained in the geotechnical engineering report	Before issuance of building permits and ground-disturbing activities.	Project applicant(s) of all project phases.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the two off-site roadway connections from Folsom Heights into El Dorado Hills: El Dorado County Public Works Department. 3. For the off-site detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department. 4. For the U.S. 50 interchange improvements: Caltrans.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
shall be noted on the grading plans and implemented as appropriate before construction begins. Design and construction of all new project development shall be in accordance with the CBC. The project applicant(s) shall provide for engineering inspection and certification that earthwork has been performed in conformity with recommendations contained in the geotechnical report.				
Mitigation Measure 3A.7-1b: Monitor Earthwork during Earthmoving Activities. All earthwork shall be monitored by a qualified geotechnical or soils engineer retained by the project applicant(s) of each project phase. The geotechnical or soils engineer shall provide oversight during all excavation, placement of fill, and disposal of materials removed from and deposited on both on- and off-site construction areas. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., El Dorado and/or Sacramento Counties, or Caltrans).	Before issuance of building permits and ground-disturbing activities.	Project applicant(s) of all project phases.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the two off-site roadway connections from Folsom Heights into El Dorado Hills: El Dorado County Public Works Department. 3. For the off-site detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department. 4. For the U.S. 50 interchange improvements: Caltrans.	
Mitigation Measure 3A.7-3: Prepare and Implement the Appropriate Grading and Erosion Control Plan. Before grading permits are issued, the project applicant(s) of each project phase that would be located within the City of Folsom shall retain a California Registered Civil Engineer to prepare a grading and erosion control plan. The grading and erosion control plan shall be submitted to the City Public Works Department before issuance of grading permits for all new development. The plan shall be consistent with the City's Grading Ordinance, the City's Hillside Development Guidelines, and the state's NPDES permit, and shall include the site-specific grading associated with development for all project phases. For the two off-site roadways into El Dorado Hills, the project applicant(s) of that phase shall retain a California Registered Civil Engineer to prepare a grading and erosion control plan. The grading and erosion control plan shall be submitted to the El Dorado County Public Works Department and the El Dorado Hills Community Service District before issuance of grading permits for roadway construction in El Dorado Hills. The plan shall be consistent with El Dorado County's Grading, Erosion, and Sediment Control Ordinance and the state's NPDES permit, and shall include the site-specific grading associated with roadway development. For the off-site detention basin west of Prairie City Road, the project applicant(s) of that phase shall retain a California Registered Civil Engineer to prepare a grading and erosion control plan. The grading and erosion control plan shall be submitted to the Sacramento County Public Works Department before issuance of a grading permit. The plan shall be consistent with Sacramento County's Grading, Erosion, and Sediment Control Ordinance and the state's NPDES permit, and shall include the site-specific grading associated with construction of the detention basin. The plans referenced above shall include the location, implementation schedule, and maintenance schedule of all erosion and sediment control measures, a description of measures designed to control dust and stabilize the construction-site road and entrance, and a description of the location and methods of storage and disposal of construction materials. Erosion and sediment control measures could include the use of detention basins, berms, swales, wattles, and silt fencing, and covering or watering of stockpiled soils to reduce wind erosion. Stabilization on steep slopes could include construction of retaining walls and reseeding with vegetation after construction. Stabilization of construction entrances to minimize trackout (control dust) is commonly achieved by installing filter fabric and crushed rock to a depth of approximately 1 foot. The project applicant(s) shall ensure that the construction contractor is responsible for securing a source of transportation and deposition of excavated materials. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., El Dorado and/or Sacramento Counties). Implementation of Mitigation Measure 3A.9-1 (discussed in Section 3A.9, "Hydrology and Water Quality – Land") would also help reduce erosion-related impacts.	Before the start of construction activities.	Project applicant(s) of all project phases.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the two off-site roadway connections from Folsom Heights into El Dorado Hills: El Dorado County Public Works Department. 3. For the off-site detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
Mitigation Measure 3A.7-4: Prepare a Seismic Refraction Survey and Obtain Appropriate Permits for all On-Site and Off-site Elements East of Old Placerville Road. Before the start of all construction activities east of Old Placerville Road, the project applicant(s) for any discretionary development application shall retain a licensed geotechnical engineer to perform a seismic refraction survey. Project-related excavation activities shall be carried out as recommend by the geotechnical engineer. Excavation may include the use of heavy-duty equipment such as large bulldozers or large excavators, and may include blasting. Appropriate permits for blasting operations shall be obtained from the relevant City or county jurisdiction prior to the start of any blasting activities. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., El Dorado and/or Sacramento Counties).	Before or during earthmoving activities.	Project applicant(s) of all project phases for on-site and off-site elements east of Old Placerville Road.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the two off-site roadway connections from Folsom Heights into El Dorado Hills: El Dorado County Public Works Department.	
Mitigation Measure 3A.7-5: Divert Seasonal Water Flows Away from Building Foundations. The project applicant(s) of all project phases shall either install subdrains (which typically consist of perforated pipe and gravel, surrounded by nonwoven geotextile fabric), or take such other actions as recommended by the geotechnical or civil engineer for the project that would serve to divert seasonal flows caused by surface infiltration, water seepage, and perched water during the winter months away from building foundations.	Before and during earthmoving activities.	Project applicant(s) of all project phases.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the two roadway connections in El Dorado Hills: El Dorado County Public Works Department.	
Mitigation Measure 3A.7-9: Conduct Soil Sampling in Areas of the SPA Designated as MRZ-3 for Kaolin Clay and if Found, Delineate its Location and Notify Lead Agency and the California Division of Mines and Geology. The project applicant(s) of all applicable project phases shall retain a licensed geotechnical or soils engineer to analyze soil core samples that shall be extracted from that portion of the SPA zoned MRZ-3 for kaolin clay, as shown on Exhibit 3A.7-3. In the event that kaolin clay is discovered, the City of Folsom, Sacramento County, and CDMG shall be notified. In addition, the approximate horizontal and vertical extent of available kaolin clay shall be delineated by the geotechnical or soils engineer.	Before issuance of building permits for development within the Ione Formation.	Project applicant(s) of all project phases in the Ione Formation.	City of Folsom Community Development Department, Sacramento County Planning and Community Development Department, California Division of Mines and Geology.	
Mitigation Measure 3A.7-10: Conduct Construction Personnel Education, Stop Work if Paleontological Resources are Discovered, Assess the Significance of the Find, and Prepare and Implement a Recovery Plan as Required. To minimize potential adverse impacts on previously unknown potentially unique, scientifically important paleontological resources, the project applicant(s) of all project phases where construction would occur in the Ione and Mehrten Formations shall do the following: ▸ Before the start of any earthmoving activities for any project phase in the Ione or Mehrten Formations, the project applicant(s) shall retain a qualified paleontologist or archaeologist to train all construction personnel involved with earthmoving activities, including the site superintendent, regarding the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction, and proper notification procedures should fossils be encountered. ▸ If paleontological resources are discovered during earthmoving activities, the construction crew shall immediately cease work in the vicinity of the find and notify the appropriate lead agency (identified below). The project applicant(s) shall retain a qualified paleontologist to evaluate the resource and prepare a recovery plan in accordance with Society of Vertebrate Paleontology guidelines (1996). The recovery plan may include, but is not limited to, a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Recommendations in the recovery plan that are determined by the lead agency to be necessary and feasible shall be implemented before construction activities can resume at the site where the paleontological resources were discovered. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., Sacramento County).	During earthmoving activities in the Ione and Mehrten Formations.	Project applicant(s) of all project phases within the Ione and Mehrten Formations.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
Mitigation Measure 3B.7-1a: Prepare Geotechnical Report(s) for the Off-site Water Facilities and Implement Required Measures. Facility design for all Off-site Water Facility components shall comply with the site-specific design recommendations as provided by a licensed geotechnical or civil engineer to be retained by the City. The final geotechnical and/or civil engineering report shall address and make recommendations on the following: ▸ site preparation; ▸ soil bearing capacity; ▸ appropriate sources and types of fill; ▸ potential need for soil amendments; ▸ road, pavement, and parking areas; ▸ structural foundations, including retaining-wall design; ▸ grading practices; ▸ soil corrosion of concrete and steel; ▸ erosion/winterization; ▸ seismic ground shaking; ▸ liquefaction; and ▸ expansive/unstable soils. In addition to the recommendations for the conditions listed above, the geotechnical investigation shall include subsurface testing of soil and groundwater conditions, and shall determine appropriate foundation designs that are consistent with the version of the CBC that is applicable at the time building and grading permits are applied for. All recommendations contained in the final geotechnical engineering report shall be implemented by the City.	Prior to completion of engineering plans for all Off-site Water Facilities.	City of Folsom Utilities Department	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site water facilities within Unincorporated Sacramento County or the City of Rancho Cordova: Sacramento County Planning and Community Development Department or City of Rancho Cordova Planning Department.	
Mitigation Measure 3B.7-1b: Incorporate Pipeline Failure Contingency Measures Into Final Pipeline Design. Isolation valves or similar devices shall be incorporated into all pipeline facilities to prevent substantial losses of surface water in the event of pipeline rupture, as recommended by a licensed geotechnical or civil engineer. The specifications of the isolation valves shall conform to the CBC and American Water Works Association standards.	Prior to completion of engineering plans for all Off-site Water Facilities.	City of Folsom Utilities Department	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site water facilities within Unincorporated Sacramento County or the City of Rancho Cordova: Sacramento County Planning and Community Development Department or City of Rancho Cordova Planning Department.	
Mitigation Measure 3B.7-4: Implement Corrosion Protection Measures. As determined appropriate by a licensed geotechnical or civil engineer, the City shall ensure that all underground metallic fittings, appurtenances, and piping include a cathodic protection system to protect these facilities from corrosion.	Prior to completion of engineering plans for all Off-site Water Facilities	Implementation: City of Folsom Utilities Department	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site water facilities within Unincorporated Sacramento County or the City of Rancho Cordova: Sacramento County Planning and Community	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
			Development Department or City of Rancho Cordova Planning Department.	
Mitigation Measure 3B.7-5: Conduct Construction Personnel Education, Stop Work if Paleontological Resources are Discovered, Assess the Significance of the Find, and Prepare and Implement a Recovery Plan as Required. To minimize potential adverse impacts on previously unknown potentially unique, scientifically important paleontological resources, the City shall implement appropriate measures during construction of the Offsite Water Facility improvements. These measures shall be required for construction activities at the following locations: (1) Grant Line Road, south of SR 16; (2) Florin road, east of Excelsior Road; (3) Gerber Road, east of Excelsior Road; (4) White Rock Road, east of Prairie City Road; and (5) Prairie City Road and shall include: ▸ Before the start of any earthmoving activities for any project phase in the Riverbank Formation, the project applicant(s) shall retain a qualified paleontologist or archaeologist to train all construction personnel involved with earthmoving activities, including the site superintendent, regarding the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction, and proper notification procedures should fossils be encountered. ▸ If paleontological resources are discovered during earthmoving activities, the construction crew shall immediately cease work in the vicinity of the find and notify Sacramento County Planning and Community Development Department. The project applicant(s) shall retain a qualified paleontologist to evaluate the resource and prepare a recovery plan in accordance with Society of Vertebrate Paleontology guidelines (1996). The recovery plan may include, but is not limited to, a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Recommendations in the recovery plan that are determined by the County to be necessary and feasible shall be implemented before construction activities can resume at the site where the paleontological resources were discovered.	During earthmoving activities in the Roverbank, Ione, and Mehrten Formations as shown in Wagner et al, 1981.	City of Folsom Utilities Department	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site water facilities within Unincorporated Sacramento County or the City of Rancho Cordova: Sacramento County Planning and Community Development Department or City of Rancho Cordova Planning Department.	
3A.8 HAZARDS AND HAZARDOUS MATERIALS - LAND				
Mitigation Measure 3A.8-2: Complete Investigations Related to the Extent to Which Soil and/or Groundwater May Have Been Contaminated in Areas Not Covered by the Phase I and II Environmental Site Assessments and Implement Required Measures. The project applicant(s) for any discretionary development application shall conduct Phase I Environmental Site Assessments (where an Phase I has not been conducted), and if necessary, Phase II Environmental Site Assessments, and/or other appropriate testing for all areas of the SPA and include, as necessary, analysis of soil and/or groundwater samples for the potential contamination sites that have not yet been covered by previous investigations (as shown in Exhibit 3A.8-1) before construction activities begin in those areas. Recommendations in the Phase I and II Environmental Site Assessments to address any contamination that is found shall be implemented before initiating ground-disturbing activities in these areas. The project applicant(s) shall implement the following measures before ground-disturbing activities to reduce health hazards associated with potential exposure to hazardous substances: ▸ Prepare a plan that identifies any necessary remediation activities appropriate for proposed on- and off-site uses, including excavation and removal of on-site contaminated soils, redistribution of clean fill material in the SPA, and closure of any abandoned mine shafts. The plan shall include measures that ensure the safe transport, use, and disposal of contaminated soil and building debris removed from the site. In the event that contaminated groundwater is encountered during site excavation activities, the contractor shall report the contamination to the appropriate regulatory agencies, dewater the excavated area, and treat the contaminated groundwater to remove contaminants before discharge into the sanitary sewer system. The project applicant(s) shall be required to comply with the plan and applicable Federal, state, and local laws. The plan shall outline measures for specific handling and reporting procedures for hazardous materials and disposal of hazardous materials removed from the site at an appropriate off-site disposal facility. ▸ Notify the appropriate Federal, state, and local agencies if evidence of previously undiscovered soil or groundwater contamination (e.g., stained soil, odorous groundwater) is encountered during construction activities. Any contaminated areas shall be remediated in accordance with recommendations made by the Sacramento County Environmental Management Department, Central Valley RWQCB, DTSC, and/or other appropriate Federal, state, or local regulatory agencies. ▸ Obtain an assessment conducted by PG&E and SMUD pertaining to the contents of any existing pole-mounted transformers located in the SPA. The assessment shall determine whether existing on-site electrical transformers contain PCBs and whether there are any records of spills from such equipment. If equipment containing PCB is identified, the maintenance and/or disposal of the transformer shall be subject to the regulations of the Toxie Substances Control Act under the authority of the Sacramento County Environmental Health Department.	Project applicant(s) of all project phases for any discretionary development application.	Before and during earthmoving activities.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site detention basin west of Prairie City Road: Sacramento County Environmental Management Department. 3. Other regulatory agencies, such as California Department of Toxic Substances Control, or Central Valley Regional Water Quality Control Board, as appropriate.	

Table 1
Mitigation Monitoring and Reporting Plan for the Folsom South of U.S. Highway 50 Specific Plan Project

Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., Sacramento County).				
Mitigation Measure 3A.8-3a: Require the Project Applicant(s) to Cooperate with Aerojet and Regulatory Agencies to Preserve, Modify, or Close Existing Groundwater Monitoring Wells. The project applicant(s) for any particular discretionary development that would occur in or adjacent to the Area 40 boundary shall consult with Aerojet, EPA, DTSC, and/or the Central Valley RWQCB or any successor in interest to establish the preservation, modification, or closure of existing groundwater monitoring wells. If necessary, Aerojet, or any successor may purchase lots or obtain access agreements from the project applicant(s) to maintain access to monitoring wells and/or remediation systems. If groundwater wells are to be affected by proposed tentative maps, then the project applicant(s) or successors shall provide the City with evidence that the relocation, modification, or closure of the well(s) is approved by the appropriate agencies as part of the City's final map approval process and before development. The project applicant(s) for activities related to the off-site detention basin located outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) with Sacramento County.	Ongoing to the satisfaction of EPA DTSC and/or the Central Valley RWQCB.	Project applicants(s) for activities that would occur in the Area 40 boundary or on areas used for groundwater monitoring and other remediation activities.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department.	
Mitigation Measure 3A.8-3b: Coordinate Development Activities to Avoid Interference with Remediation Activities. The project applicant(s) for any particular discretionary development that would occur in or adjacent to the Area 40 boundary shall provide notice to Acrojet or any successor in interest and DTSC, the Central Valley RWQCB, and the City of Folsom of the location, nature, and duration of construction activities least 30 days before construction activities begin in areas on or near property with current or planned remediation activities (Area 40). Remedial actions, as required by DTSC, RWQCB, and/or the EPA, may include, but are not limited to: ▸ deed restrictions on land and groundwater use; ▸ requirements for building ventilation, heating, and air conditioning design; ▸ monitoring; ▸ installation of vertical barriers; ▸ biological, chemical, and/or physical treatment; ▸ extraction or excavation; and/or ▸ pump and treat activities. Before the approval of grading plans which include areas within the Area 40 boundary or the off-site detention basin, the project applicant(s) shall consult with Aerojet, EPA, DTSC, and/or the Central Valley RWQCB or any successor to schedule the timing of construction activities to prevent potential conflicts with investigation and remediation activities. The project applicant(s) for activities related to the off-site detention basin located outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) with Sacramento County.	Before the approval of grading plans and during construction activities within the Area 40 boundary, off-site detention basin, or on lands used for monitoring or other remediation-related activities.	Project applicant(s) for activities within the Area 40 boundary or on lands used for monitoring or other remediation-related activities.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department. 3. U.S. Environmental Protection Agency, California Department of Toxic Substances Control, and/or Central Valley Regional Water Quality Control Board, Aerojet General Corporation, as appropriate.	
Mitigation Measure 3A.8-3c: Provide Written Notification to the City that, as required by EPA, DTSC, and the Central Valley RWQCB, -Required Notification Obligations and/or Easements Have Been Fulfilled to Ensure that Construction Activities Do Not Interfere with Remedial Actions. Pursuant to their oversight over investigations of hazardous substances and determination of remedial action, EPA and/or DTSC establish, as appropriate, deed restrictions (e.g., restrictions on future groundwater uses or future land uses) or easements (e.g., continued access to groundwater wells and pipelines) on property with associated notice requirements. The project applicant(s) for all such affected project activities, located within the Area 40 boundary, the off-site detention basin, or lands subject to monitoring or other remediation activities shall provide notification in writing to the City (or Sacramento County for the off-site detention basin) that said required notification obligations have been fulfilled. Evidence of the method of notification required by EPA and/or DTSC shall be submitted to the City before approval of tentative maps or improvement plans. The project applicant(s) for such affected project activities shall coordinate with the City to include this provision as part of tentative map approval within the Area 40 boundary or lands subject to monitoring or other remediation activities. The project applicant(s) shall coordinate with Sacramento County for such affected project activities pertaining to the off-site detention basin. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., Sacramento County). Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., Sacramento County).	Before approval of final maps and/or issuance of permits for sales trailers and model homes within the Area 40 boundary, the off-site detention basin, or lands subject to monitoring or other remediation activities.	Project applicant(s) for activities that would occur in the Area 40 boundary or on areas used for groundwater monitoring and other remediation activities.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
Mitigation Measure 3A.8-3d: Land Use Restrictions for Contaminated Soil and Groundwater within Area 40 as depicted on the Remedial Restrictions Area Exhibit 3A.8-9. Prior to approval of any tentative maps, improvement plans, or discretionary project approvals for locations within Area 40, as depicted in the Remedial Restrictions Area (Exhibit 3A.8-9), the project applicant(s) shall designate those areas that are subject to off-gassing hazards in excess of an indoor air standard, as open space or park use, as required by the City and Aerojet in consultation with the EPA. Areas designated for open space or park under this mitigation measure shall be determined by the City and by Aerojet in consultation with the EPA using risk calculations (completed in accordance with EPA's 1989 *Risk Assessment Guidance for Superfund* [EPA/540/1-89-002] and DTSC's 1992 *Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities* and 1994 *Preliminary Endangerment Assessment Guidance Manual*, or such guidance as may be in place at the time risk assessment is performed) for exposure to off-gassing from either soil or groundwater based on detected PCE and TCE concentrations. The project applicant(s) for such affected areas located within Area 40 as depicted on the Remedial Restrictions Area Exhibit 3A.8-9 shall implement this measure as part of tentative map applications or other discretionary project approvals when such applications are submitted to the City. If the portions of Area 40 that are designated for park and open space use are not available for use as park and open space as identified in the SPA concurrently with surrounding development that creates demand for park and open space use, the project applicant(s), and the owners of land within the SPA shall identify and the City may rezone equivalent acreage of suitable park and open space land within the SPA for development as interim or permanent park and open space to meet the then current demand.	Prior to approval of tentative maps within the Community Park West area.	Project applicant(s) in consultation with the City, Aerojet, and U.S. Environmental Protection Agency for activities that would occur in the Community Park West area.	For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department; U.S. Environmental Protection Agency.	
Mitigation Measure 3A.8-5: Prepare and Implement a Blasting Safety Plan in Consultation with a Qualified Blaster. To reduce the potential for accidental injury or death related to blasting, contractors whose work on the SPA will include blasting shall prepare and implement a blasting safety plan. This plan shall be created in coordination with a qualified blaster, as defined by the Construction Safety and Health Outreach Program, Subpart U, Section 1926.901, and distributed to all appropriate members of construction teams. The plan shall apply to project applicant(s) of all project phases in which blasting would be employed. The plan shall include, but is not limited to: ▸ storage locations that meet ATF standards contained in 27 CFR Part 55; ▸ safety requirements for workers (e.g., daily safety meetings, personal protective equipment); ▸ an accident management plan that considers misfires (i.e. explosive fails to detonate), unexpected ignition, and flyrock; and ▸ measures to protect surrounding property (e.g., netting, announcement of dates of expected blasting, barricades, and audible and visual warnings). Upon completion of a blasting safety plan, the project applicant(s) contractor shall secure any required permits from the City of Folsom Fire Department and the El Dorado County Sheriff's Department for blasting activities in Sacramento County and El Dorado County, respectively. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., El Dorado County).	At the submission of tentative map applications.	Project applicant(s) and contractor(s) of all project phases in which blasting would be employed.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Fire Department. 2. For the off-site roadway connections in El Dorado County: El Dorado County Sheriff's Department.	
Mitigation Measure P3A.8-6: Prudent Avoidance and Notification of EMF Exposure. Potential purchasers of residential properties near the transmission lines shall be made aware of the controversy surrounding EMF exposure. The California Department of Real Estate shall be requested to insert an appropriate notification into the applicant's final Subdivision Public Report application, which shall be provided to purchasers of properties within 100 feet from the 100-115kV power line , or within 150 feet from the 220-230 kV power line . The notification would include a discussion of the scientific studies and conclusions reached to date, acknowledge that the notification distance is not based on specific biological evidence, but rather, the distance where background levels may increase, and provide that, given some uncertainty in the data, this notification is merely provided to allow purchasers to make an informed decision.	At the submission of tentative map applications.	Project applicant(s) of all project phases for any particular discretionary development entitlement in the vicinity of high-tension transmission lines.	1. City of Folsom Community Development Department. 2. Folsom Cordova Unified School District.	
Mitigation Measure 3A.8-7: Prepare and Implement a Vector Control Plan in Consultation with the Sacramento-Yolo Mosquito and Vector Control District. To ensure that operation and design of the stormwater system, including multiple planned detention basins, is consistent with the recommendations of the Sacramento-Yolo Mosquito and Vector Control District regarding mosquito control, the project applicant(s) of all project phases shall prepare and implement a Vector Control Plan. This plan shall be prepared in coordination with the Sacramento-Yolo Mosquito and Vector Control District and shall be submitted to the City for approval before issuance of the grading permit for the detention basins under the City's jurisdiction. For the off-site detention basin, the plan shall be submitted to Sacramento County for approval before issuance of the grading permit for the off-site detention basin. The plan shall incorporate specific measures deemed sufficient by the City to minimize public health risks from mosquitoes, and as contained within the Sacramento-Yolo Mosquito and Vector Control District BMP Manual (Sacramento-Yolo Mosquito and Vector Control District 2008). The plan shall include, but is not limited to, the following components:	Before issuance of grading permits for the project water features.	Project applicant(s) of all project phases containing water features.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site detention basin west of Prairie City Road: Sacramento-Yolo Mosquito and Vector	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
► Description of the project. ► Description of detention basins and all water features and facilities that would control on-site water levels. ► Goals of the plan. ► Description of the water management elements and features that would be implemented, including: • BMPs that would implemented on-site; • public education and awareness; • sanitary methods used (e.g., disposal of garbage); • mosquito control methods used (e.g., fluctuating water levels, biological agents, pesticides, larvacides, circulating water); and • stormwater management (consistent with Stormwater Management Plan). ► Long-term maintenance of the detention basins and all related facilities (e.g., specific ongoing enforceable conditions or maintenance by a homeowner's association). To reduce the potential for mosquitoes to reproduce in the detention basins, the project applicant(s) shall coordinate with the Sacramento-Yolo Mosquito and Vector Control District to identify and implement BMPs based on their potential effectiveness for SPA conditions. Potential BMPs could include, but are not limited to, the following: • build shoreline perimeters as steep and uniform as practicable to discourage dense plant growth; • perform routine maintenance to reduce emergent plant densities to facilitate the ability of mosquito predators (i.e., fish) to move throughout vegetated area; • design distribution piping and containment basins with adequate slopes to drain fully and prevent standing water. The design slope should take into consideration buildup of sediment between maintenance periods. Compaction during grading may also be needed to avoid slumping and settling; • coordinate cleaning of catch basins, drop inlets, or storm drains with mosquito treatment operations; • enforce the prompt removal of silt screens installed during construction when no longer needed to protect water quality; • if the sump, vault, or basin is sealed against mosquitoes, with the exception of the inlet and outlet, submerge the inlet and outlet completely to reduce the available surface area of water for mosquito egg–laying (female mosquitoes can fly through pipes); and • design structures with the appropriate pumping, piping, valves, or other necessary equipment to allow for easy dewatering of the unit if necessary (Sacramento Yolo Mosquito and Vector Control District 2008). The project applicant(s) of the project phase containing the off-site detention basin shall coordinate mitigation for the off-site with the affected oversight agency (i.e., Sacramento County).			Control District.	
3B.8 HAZARDS AND HAZARDOUS MATERIALS – WATER				
Mitigation Measure 3B.8-1a: Transport, Store, and Handle Construction-Related Hazardous Materials in Compliance with Relevant Regulations and Guidelines. The City shall ensure, through the enforcement of contractual obligations, that all contractors transport, store, and handle construction-related hazardous materials in a manner consistent with relevant regulations and guidelines, including those recommended and enforced by Caltrans, Central Valley RWQCB, local fire departments, and the County environmental health department. Recommendations shall include as appropriate transporting and storing materials in appropriate and approved containers, maintaining required clearances, and handling materials using applicable Federal, state and/or local regulatory agency protocols. In addition, all precautions required by the Central Valley RWQCB-issued NPDES construction activity stormwater permits shall be taken to ensure that no hazardous materials enter any nearby waterways. In the event of a spill, the City shall ensure, through the enforcement of contractual obligations, that all contractors immediately control the source of any leak and immediately contain any spill utilizing appropriate spill containment and countermeasures. If required by the local fire departments, the local environmental health department, or any other regulatory agency, contaminated media shall be collected and disposed of at an off-site facility approved to accept such media. The storage, handling, and use of the construction-related hazardous materials shall be in accordance with applicable Federal, state, and local laws. Construction-related hazardous materials and hazardous wastes (e.g., fuels and waste oils) shall be stored away from stream channels and steep banks to prevent these materials from entering surface waters in the event of an accidental release. These materials shall be kept at sufficient distance (at least 500 feet) from nearby residences or other sensitive land uses. This includes materials stored for expected use, materials in equipment and vehicles, and waste materials.		City of Folsom Utilities Department	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site water facilities constructed within Sacramento County or the City of Rancho Cordova: Sacramento County Environmental Management Department. 3. Other regulatory agencies, such as California Department of Toxic Substances Control, or Central Valley Regional Water Quality Control Board, as appropriate.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
Mitigation Measure 3B.8-1b: Prepare and Implement a Hazardous Materials Management Plan. The City shall prepare a Hazardous Materials Management Plan (HMMP) for the proposed WTP. The HMMP shall provide for safe storage, containment, and disposal of chemicals and hazardous materials related to WTP operations, including waste materials. The plan shall include, but shall not be limited to, the following: ► a description of hazardous materials and hazardous wastes; ► a description of handling, transport, treatment, and disposal procedures, as relevant for each hazardous material or hazardous waste; ► preparedness, prevention, contingency, and emergency procedures, including emergency contact information; ► A description of personnel training including, but not limited to: (1) recognition of existing or potential hazards resulting from accidental spills or other releases; (2) implementation of evacuation, notification, and other emergency response procedures; (3) management, awareness, and handling of hazardous materials and hazardous wastes, as required by their level of responsibility; ► Instructions on keeping Materials Safety and Data Sheets (MSDS) on-site for each on-site, hazardous chemical; ► Identification of the locations of hazardous material storage areas, including temporary storage areas, which shall be equipped with secondary containment sufficient in size to contain the volume of the largest container or tank; and ► A description of equipment maintenance procedures. The HMMP shall be made a condition of contractual obligation and shall be available for review by construction inspectors and implementation compliance shall be monitored.	Prior to construction and operation of all Off-site Water Facilities	City of Folsom Utilities Department	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site water facilities constructed within Sacramento County or the City of Rancho Cordova: Sacramento County Environmental Management Department. 3. Other regulatory agencies, such as California Department of Toxic Substances Control, or Central Valley Regional Water Quality Control Board, as appropriate.	
Mitigation Measure 3B.8-5a: Conduct Phase 1 Environmental Site Assessment for Selected Atignment. Prior to construction, the City shall conduct a Phase 1 Environmental Site Assessment according to American Society for Testing and Materials (ASTM) protocol for the selected conveyance pipeline alignment, pump station, well, and WTP site. If any hazardous materials or waste sites are identified during the Phase 1 Environmental Site Assessment, the City shall implement Mitigation Measure 3.8-5b.	Prior to construction of all Off-site Water Facilities	City of Folsom Utilities Department	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site water facilities constructed within Sacramento County or the City of Rancho Cordova: Sacramento County Environmental Management Department. 3. Other regulatory agencies, such as California Department of Toxic Substances Control, or Central Valley Regional Water Quality Control Board, as appropriate.	
Mitigation Measure 3B.8-5b: Develop and Implement a Remediation Plan. If determined necessary to mitigate for potential hazards resulting from disturbance of existing contaminated areas, the extent of contamination from hazardous materials sites within or adjacent to the Off-site Water Facilities construction area shall be delineated during final design. Disturbance to contaminated areas during Off-site Water Facilities construction shall be avoided, or any work done within contaminated areas shall be undertaken in compliance with standards approved by the DTSC or Sacramento County Department of Environmental Health to ensure that hazardous materials will not be released as a result of the ground disturbance. Additionally, if unidentified contaminated soil or groundwater are encountered, or if suspected contamination is encountered during any construction activities, work shall be halted in the area of potential exposure, and the type and extent of contamination shall be identified. A qualified professional, in consultation with appropriate regulatory agencies, will then develop and implement a plan to remediate the contamination and properly dispose of the contaminated material.	Prior to construction of all Off-site Water Facilities	City of Folsom Utilities Department	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site water facilities constructed within Sacramento County or the City of Rancho Cordova:	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
			Sacramento County Environmental Management Department. 3. Other regulatory agencies, such as California Department of Toxic Substances Control, or Central Valley Regional Water Quality Control Board, as appropriate.	
Mitigation Measure 3B.8-7a: Keep Construction Area Clear of Combustible Materials. The City shall ensure, through the enforcement of contractual obligations that during construction, staging areas, welding areas, or areas slated for development using spark-producing equipment shall be cleared of dried vegetation or other materials that could serve as fire fuel. The contractor shall keep these areas clear of combustible materials in order to maintain a firebreak. Any construction equipment that normally includes a spark arrester shall be equipped with an arrester in good working order. This includes, but is not limited to, vehicles, heavy equipment, and chainsaws.	Prior to construction and operation of all Off-site Water Facilities	City of Folsom Utilities Department	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site water facilities constructed within Sacramento County or the City of Rancho Cordova: Sacramento County Fire Department	
Mitigation Measure 3B.8-7b: Provide Accessible Fire Suppression Equipment. Work crews shall be required to carry or have sufficient fire suppression equipment to ensure that any fire resulting from construction activities is immediately extinguished. All off-road equipment using internal combustion engines shall be equipped with spark arrestors.	Prior to construction and operation of all Off-site Water Facilities	City of Folsom Utilities Department	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the off-site water facilities constructed within Sacramento County or the City of Rancho Cordova: Sacramento County Fire Department.	
3A.9 HYDROLOGY AND WATER QUALITY - LAND				
Mitigation Measure 3A.9-1: Acquire Appropriate Regulatory Permits and Prepare and Implement SWPPP and BMPs. Prior to the issuance of grading permits, the project applicant(s) of all projects disturbing one or more acres (including phased construction of smaller areas which are part of a larger project) shall obtain coverage under the SWRCB's NPDES stormwater permit for general construction activity (Order 2009-0009-DWQ), including preparation and submittal of a project-specific SWPPP at the time the NOI is filed. The project applicant(s) shall also prepare and submit any other necessary erosion and sediment control and engineering plans and specifications for pollution prevention and control to Sacramento County, City of Folsom, El Dorado County (for the off-site roadways into El Dorado Hills under the Proposed Project Alternative). The SWPPP and other appropriate plans shall identify and specify: ▸ the use of an effective combination of robust erosion and sediment control BMPs and construction techniques accepted by the local jurisdictions for use in the project area at the time of construction, that shall reduce the potential for runoff and the release, mobilization, and exposure of pollutants, including legacy sources of mercury from project-related construction sites. These may include but would not be limited to temporary erosion control and soil stabilization measures, sedimentation ponds, inlet protection, perforated riser pipes,	Submittal of the State Construction General Permit NOI and SWPPP (where applicable) and development and submittal of any other locally required plans and specifications before the issuance of grading permits for all on-site project phases and off-site elements	Project applicant(s) during all project phases and on-site and off-site elements.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the two roadway connections in El Dorado Hills: El Dorado County Department of Transportation. 3. For the detention basin west	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
check dams, and silt fences ► the implementation of approved local plans, non-stormwater management controls, permanent post-construction BMPs, and inspection and maintenance responsibilities; ► the pollutants that are likely to be used during construction that could be present in stormwater drainage and nonstormwater discharges, including fuels, lubricants, and other types of materials used for equipment operation; ► spill prevention and contingency measures, including measures to prevent or clean up spills of hazardous waste and of hazardous materials used for equipment operation, and emergency procedures for responding to spills; ► personnel training requirements and procedures that shall be used to ensure that workers are aware of permit requirements and proper installation methods for BMPs specified in the SWPPP; and ► the appropriate personnel responsible for supervisory duties related to implementation of the SWPPP. Where applicable, BMPs identified in the SWPPP shall be in place throughout all site work and construction/demolition activities and shall be used in all subsequent site development activities. BMPs may include, but are not limited to, such measures as those listed below. ► Implementing temporary erosion and sediment control measures in disturbed areas to minimize discharge of sediment into nearby drainage conveyances, in compliance with state and local standards in effect at the time of construction. These measures may include silt fences, staked straw bales or wattles, sediment/silt basins and traps, geofabric, sandbag dikes, and temporary vegetation. ► Establishing permanent vegetative cover to reduce erosion in areas disturbed by construction by slowing runoff velocities, trapping sediment, and enhancing filtration and transpiration. ► Using drainage swales, ditches, and earth dikes to control erosion and runoff by conveying surface runoff down sloping land, intercepting and diverting runoff to a watercourse or channel, preventing sheet flow over sloped surfaces, preventing runoff accumulation at the base of a grade, and avoiding flood damage along roadways and facility infrastructure. A copy of the approved SWPPP shall be maintained and available at all times on the construction site. For those areas that would be disturbed as part of the U.S. 50 interchange improvements, Caltrans shall coordinate with the development and implementation of the overall project SWPPP, or develop and implement its own SWPPP specific to the interchange improvements, to ensure that water quality degradation would be avoided or minimized to the maximum extent practicable. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., El Dorado and/or Sacramento Counties, or Caltrans).	and implementation throughout project construction.		of Prairie City Road: Sacramento County Planning and Community Development Department. 4. For the U.S. 50 interchange improvements: Caltrans. 5. For all construction activities subject to the state's Construction General Permit and violators of local ordinances referred to the state for enforcement: Central Valley Regional Water Quality Control Board.	
Mitigation Measure 3A.9-2: Prepare and Submit Final Drainage Plans and Implement Requirements Contained in Those Plans. Before the approval of grading plans and building permits, the project applicant(s) of all project phases shall submit final drainage plans to the City, and to El Dorado County for the off-site roadway connections into El Dorado Hills, demonstrating that off-site upstream runoff would be appropriately conveyed through the SPA, and that project-related on-site runoff would be appropriately contained in detention basins or managed with through other improvements (e.g., source controls, biotechnical stream stabilization) to reduce flooding and hydromodfication impacts. The plans shall include, but not be limited to, the following items: ► an accurate calculation of pre-project and post-project runoff scenarios, obtained using appropriate engineering methods, that accurately evaluates potential changes to runoff, including increased surface runoff; ► runoff calculations for the 10-year and 100-year (0.01 AEP) storm events (and other, smaller storm events as required) shall be performed and the trunk drainage pipeline sizes confirmed based on alignments and detention facility locations finalized in the design phase; ► a description of the proposed maintenance program for the on-site drainage system; ► project-specific standards for installing drainage systems; ► City and El Dorado County flood control design requirements and measures designed to comply with them; Implementation of stormwater management BMPs that avoid increases in the erosive force of flows beyond a specific range of conditions needed to limit hydromodification and maintain current stream geomorphology. These BMPs will be designed and constructed in accordance with the forthcoming SSQP Hydromodification Management Plan (to be adopted by the RWQCB) and may include, but are not limited to, the following:	Before approval of grading plans and building permits of all project phases.	Project applicant(s) during all on-site project phases and off-site elements.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Public Works Department. 2. For the two roadway connections in El Dorado Hills: El Dorado County Department of Transportation.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
• use of Low Impact Development (LID) techniques to limit increases in stormwater runoff at the point of origination (these may include, but are not limited to: surface swales; replacement of conventional impervious surfaces with pervious surfaces [e.g., porous pavement]; impervious surfaces disconnection; and trees planted to intercept stormwater); • enlarged detention basins to minimize flow changes and changes to flow duration characteristics; • bioengineered stream stabilization to minimize bank erosion, utilizing vegetative and rock stabilization, and inset floodplain restoration features that provide for enhancement of riparian habitat and maintenance of natural hydrologic and channel to floodplain interactions; • minimize slope differences between any stormwater or detention facility outfall channel with the existing receiving channel gradient to reduce flow velocity; and • minimize to the extent possible detention basin, bridge embankment, and other encroachments into the channel and floodplain corridor, and utilize open bottom box culverts to allow sediment passage on smaller drainage courses. ► The final drainage plan shall demonstrate to the satisfaction of the City of Folsom Community Development and Public Works Departments and El Dorado County Department of Transportation that 100-year (0.01 AEP) flood flows would be appropriately channeled and contained, such that the risk to people or damage to structures within or down gradient of the SPA would not occur, and that hydromodification would not be increased from pre-development levels such that existing stream geomorphology would be changed (the range of conditions should be calculated for each receiving water if feasible, or a conservative estimate should be used, e.g., an Ep of 1 ±10% or other as approved by the Sacramento Stormwater Quality Partnership and/or City of Folsom Public Works Department). Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with El Dorado County.				
Mitigation Measure 3A.9-3: Develop and Implement a BMP and Water Quality Maintenance Plan. Before approval of the grading permits for any development project requiring a subdivision map, a detailed BMP and water quality maintenance plan shall be prepared by a qualified engineer retained by the project applicant(s) the development project. Drafts of the plan shall be submitted to the City of Folsom and El Dorado County for the off-site roadway connections into El Dorado Hills, for review and approval concurrently with development of tentative subdivision maps for all project phases. The plan shall finalize the water quality improvements and further detail the structural and nonstructural BMPs proposed for the project. The plan shall include the elements described below. ► A quantitative hydrologic and water quality analysis of proposed conditions incorporating the proposed drainage design features. ► Predevelopment and postdevelopment calculations demonstrating that the proposed water quality BMPs meet or exceed requirements established by the City of Folsom and including details regarding the size, geometry, and functional timing of storage and release pursuant to the "Stormwater Quality Design Manual for Sacramento and South Placer Regions" ([SSQP 2007b] per NPDES Permit No. CAS082597 WDR Order No. R5-2008-0142, page 46) and El Dorado County's NPDES SWMP (County of El Dorado 2004). ► Source control programs to control water quality pollutants on the SPA, which may include but are limited to recycling, street sweeping, storm drain cleaning, household hazardous waste collection, waste minimization, prevention of spills and illegal dumping, and effective management of public trash collection areas. ► A pond management component for the proposed basins that shall include management and maintenance requirements for the design features and BMPs, and responsible parties for maintenance and funding. ► LID control measures shall be integrated into the BMP and water quality maintenance plan. These may include, but are not limited to: • surface swales; • replacement of conventional impervious surfaces with pervious surfaces (e.g., porous pavement); • impervious surfaces disconnection; and • trees planted to intercept stormwater. ► New stormwater facilities shall be placed along the natural drainage courses within the SPA to the extent practicable so as to mimic the natural drainage patterns. The reduction in runoff as a result of the LID configurations shall be quantified based on the runoff reduction credit system methodology described in "Stormwater Quality Design Manual for the Sacramento and South Placer Regions, Chapter 5 and Appendix D4" (SSQP 2007b) and proposed detention basins and other water quality BMPs shall be sized to handle these runoff volumes. For those areas that would be disturbed as part of the U.S. 50 interchange improvements, it is anticipated that Caltrans would coordinate with the development and implementation of the overall project SWPPP, or develop and implement its own SWPPP specific to the interchange	Prepare plans before the issuance of grading permits for all project phases and off-site elements and implementation throughout project construction.	Project applicant(s) during all on-site project phases and off-site elements.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department and Public Works Department. 2. For the two roadway connections in El Dorado Hills: El Dorado County Department of Transportation. 3. For the U.S. 50 interchange improvements: Caltrans.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
improvements, to ensure that water quality degradation would be avoided or minimized to the maximum extent practicable. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with El Dorado County and Caltrans.				
Mitigation Measure 3A.9-4: Inspect and Evaluate Existing Dams Within and Upstream of the Project Site and Make Improvements if Necessary. Prior to submittal to the City of tentative maps or improvement plans the project applicant(s) of all project phases shall perform conduct studies to determine the extent of inundation in the case of dam failure. If the studies determine potential exposure of people or structures to a significant risk of flooding as a result of the failure of a dam, the applicants(s) shall implement of any feasible recommendations provided in that study, potentially through drainage improvements, subject to the approval of the City of Folsom Public Works Department.	Prior to submittal to the City of tentative maps or improvement plans.	Project applicant(s) of all on-site project phases and off-site elements.	City of Folsom Public Works Department.	
3B.9 HYDROLOGY AND WATER QUALITY – WATER				
Mitigation Measure 3B.9-1a: Acquire Appropriate Regulatory Permits and Prepare and Implement SWPPP and BMPs. The City shall prepare a SWPPP specific to the selected Off-site Water Facility Alternative and secure coverage under SWRCB's NPDES stormwater permit for general construction activity (Order 2009-0009-DWQ). The SWPPP shall identify specific actions and BMPs relating to the prevention of stormwater pollution from project-related construction sources by identifying a practical sequence for site restoration, BMP implementation, contingency measures, responsible parties, and agency contacts. The SWPPP shall reflect localized surface hydrological conditions and shall be reviewed and approved by the City prior to commencement of work and shall be made conditions of the contract with the contractor selected to build the Off-site Water Facilities. The SWPPP shall incorporate control measures in the following categories: ► soil stabilization and erosion control practices (e.g., hydroseeding, erosion control blankets, mulching, etc.; ► dewatering and/or flow diversion practices, if required (see Mitigation Measure 3B.9-1b); ► sediment control practices (temporary sediment basins, fiber rolls, etc.); ► temporary and post-construction on- and off-site runoff controls; ► special considerations and BMPs for water crossings, wetlands, drainages, and vernal pools; ► monitoring protocols for discharge(s) and receiving waters, with emphasis placed on the following water quality objectives: dissolved oxygen, floating material, oil and grease, pH, and turbidity; ► waste management, handling, and disposal control practices; ► corrective action and spill contingency measures; ► agency and responsible party contact information, and ► training procedures that shall be used to ensure that workers are aware of permit requirements and proper installation methods for BMPs specified in the SWPPP. The SWPPP shall be prepared by a qualified SWPPP practitioner with BMPs selected to achieve maximum pollutant removal and represent the best available technology that is economically achievable. Emphasis for BMPs shall be placed on controlling discharges of oxygen-depleting substances, floating material, oil and grease, acidic or caustic substances or compounds, and turbidity. Performance and effectiveness of these BMPs shall be determined either by visual means where applicable (i.e., observation of above-normal sediment release), or by actual water sampling in cases where verification of contaminant reduction or elimination, (inadvertent petroleum release) as required to determine adequacy of the measure.	Development of the SWPPP prior to construction of all Off-site Water Facilities and implementation throughout construction.	City of Folsom Utilities Department	1. Central Valley Regional Water Quality Control Board. 2. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 3. For improvements within unincorporated Sacramento County or City of Rancho Cordova: Sacramento County Planning and Community Development Department or City of Rancho Cordova Planning Department.	
Mitigation Measure 3B.9-1b: Properly Dispose of Hydrostatic Test Water and Construction Dewatering in Accordance with the Central Valley Regional Water Quality Control Board. All hydrostatic test water and construction dewatering shall be discharged to an approved land disposal area or drainage facility in accordance with Central Valley RWCQB requirements. The City or its construction contractor shall provide the Central Valley RWQCB with the location, type of discharge, and methods of treatment and monitoring for all hydrostatic test water discharges. Emphasis shall be placed on those discharges that would occur directly to surface water bodies.	Incorporation measures into SWPPP prior to construction and implementation throughout construction, as appropriate.	City of Folsom Utilities Department	1. Central Valley Regional Water Quality Control Board. 2. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department.	

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			3. For improvements within unincorporated Sacramento County or City of Rancho Cordova: Sacramento County Planning and Community Development Department or City of Rancho Cordova Planning Department.	
Mitigation Measure 3B.9-3a: Prepare and Implement Drainage Plan(s) for Structural Facilities. The City shall prepare a Drainage Plan for the selected Off-site Water Facility WTP and shall incorporate measures to maintain off-site runoff during peak conditions to pre-construction discharge levels. The Drainage Plan shall provide both short- and long-term drainage solutions to ensure the proper sequencing of drainage facilities during and following construction. The City shall evaluate options for on-site detention including, but not limited to, providing temporary storage within a portion or portions of proposed paved areas, linear infiltration facilities along the site perimeter, and/or other on-site opportunities for detention, retention, and/or infiltration facilities. Design specifications for the detention, retention, and/or infiltration facilities shall provide sufficient storage capacity to accommodate the 10-year, 24-hour storm event. In addition, the Drainage Plan shall delineate the overland release path for flows generated by a 100-year frequency storm, so that structural pad elevations for buildings, containment facilities, storage tank, and container storage areas are placed a minimum of one foot above the property's highest frontage curb elevation. The Drainage Plan shall also provide sufficient attenuation of flows to ensure no net increase in off-site discharges to waterways that drain across the FSC via one or more drainage chutes (e.g., Buffalo Creek).	Development of the Drainage Plan prior to start of construction.	City of Folsom Utilities Department.	1. Central Valley Regional Water Quality Control Board. 2. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 3. For improvements within unincorporated Sacramento County or City of Rancho Cordova: Sacramento County Planning and Community Development Department or City of Rancho Cordova Planning Department. 4. For all off-site improvements that would drain across one or more of the FSC drainage chutes: U. S. Bureau of Reclamation.	
Mitigation Measure 3B.9-3b: Ensure the Provision of Sufficient Outlet Protection and On-site Containment. Energy dissipaters, vegetated rip-rap, soil protection, and/or other appropriate BMPs shall be included within all storm-drain outlets to slow runoff velocities and prevent erosion at discharge locations for the WTP. A long-term maintenance plan shall be implemented for all drainage discharge control devices. The WTP layout shall also include sufficient on-site containment and pollution-control devises for drainage facilities to avoid the off-site release of water quality pollutants, oil and grease.	Incorporation of measures into the Drainage Plan prior to start of construction.	City of Folsom Utilities Department	1. Central Valley Regional Water Quality Control Board. 2. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 3. For improvements within unincorporated Sacramento County or City of Rancho Cordova: Sacramento County Planning and Community Development Department or City of Rancho Cordova Planning Department.	

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3B.10 LAND USE AND AGRICULTURAL RESOURCES – WATER				
Mitigation Measure 3B.10-2: Acquire Development Approvals for Off-site WTPs. The City shall implement one of the two following options to enable development of the White Rock WTP under Off-site Water Facility Alternatives 1, 1A, 3, and 3A: (1) Annexation and Pre-Zoning to Public Use. The City shall file an application with Sacramento LAFCo to amend its sphere of influence to include the White Rock WTP . The application shall include a statement describing that the sphere of influence amendment is necessary to ensure the provision of adequate water supply, distribution, and treatment for planned development with the Folsom SPA. Subject to LAFCo approval of the sphere of influence amendment, the City shall prepare an application to annex and prezone the White Rock WTP site for Public Use. As part of the White Rock WTP site's design, spacing opportunities between the WTP facilities and adjacent land use shall be maximized to encourage open space continuity and disruption to adjacent agricultural areas. Prior the annexation approval, the City shall provide LAFCo with the following: (a) dedications of rights-of-way; (b) improvements for vehicle access; (c) the placement of structures and their associated height; and (d) landscaping/open space for the protection of adjoining and nearby properties. or (2) Obtain County Use Permit or General Plan Amendment. The City shall file an application with Sacramento County for a Use Permit to allow the operation of the proposed WTP within the AG-80 zone. The City shall comply with the conditions of the Use Permit, so that the WTP site is developed consistent with County requirements in terms of the following: (a) dedications of right-of-way; (b) improvements for vehicle access; (c) the placement of structures and their associated height; and (d) landscaping for the protection of adjoining and nearby properties. Alternatively, the City may file an application for a General Plan Amendment and Rezone to designate the White Rock WTP site for Public Use. In addition to complying with the requirements of the Public zone, the City shall develop the site consistent with the County's for the following: (a) dedications of right-of-way; (b) improvements for vehicle access; (c) the placement of structures and their associated height; and (d) landscaping for the protection of adjoining and nearby properties.	Prior to acquisition and development of the Off-site WTP	City of Folsom Utilities Department	1. For annexation and sphere of influence applications: Sacramento County LAFCo. 2. For the entitlement and General Plan applications through Sacramento County: Sacramento County Planning and Community Development Department.	
Mitigation Measure 3B.10-4: Restore Affected Agricultural Lands to Preproject Conditions. The City shall consult with all affected land owners where the selected alignment would cross Important Farmland. As part of the easement acquisition process, the City shall demonstrate a good-faith effort to negotiate with affected landowners an agreed-upon compensation for the loss of any existing pasture and/or row crops currently in production. During these consultations the City shall also, in conjunction with landowners' input, identify areas along the right-of-way that could be left in agricultural production as well as locations for access gates to allow for city staff access. Access gate locations shall be included in the final design plans for the Off-site Water Facilities. Compensation for the loss of crops and associated revenues shall be up to the provisions of law.	Immediately following construction	City of Folsom Utilities Department	Sacramento County Community Development and Planning Department	
3A.11 NOISE - LAND				
Mitigation Measure 3A.11-1: Implement Noise-Reducing Construction Practices, Prepare and Implement a Noise Control Plan, and Monitor and Record Construction Noise near Sensitive Receptors. To reduce impacts associated with noise generated during project-related construction activities, the project applicant(s) and their primary contractors for engineering design and construction of all project phases shall ensure that the following requirements are implemented at each work site in any year of project construction to avoid and minimize construction noise effects on sensitive receptors. The project applicant(s) and primary construction contractor(s) shall employ noise-reducing construction practices. Measures that shall be used to limit noise shall include the measures listed below: ▸ Noise-generating construction operations shall be limited to the hours between 7 a.m. and 7 p.m. Monday through Friday, and between 8 a.m. and 6 p.m. on Saturdays and Sundays. ▸ All construction equipment and equipment staging areas shall be located as far as possible from nearby noise-sensitive land uses. ▸ All construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation. ▸ All motorized construction equipment shall be shut down when not in use to prevent idling. ▸ Individual operations and techniques shall be replaced with quieter procedures (e.g., using welding instead of riveting, mixing concrete off-site instead of on-site). ▸ Noise-reducing enclosures shall be used around stationary noise-generating equipment (e.g., compressors and generators) as planned phases are built out and future noise sensitive receptors are located within close proximity to future construction activities. ▸ Written notification of construction activities shall be provided to all noise-sensitive receptors located within 850 feet of construction activities. Notification shall include anticipated dates and hours during which construction activities are anticipated to occur and contact	Before and during construction activities on the SPA and within El Dorado Hills.	Project applicant(s) and primary contractor(s) of all project phases.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the two roadway connections off-site into El Dorado Hills: El Dorado County Development Services Department.	

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information, including a daytime telephone number, for the project representative to be contacted in the event that noise levels are deemed excessive. Recommendations to assist noise-sensitive land uses in reducing interior noise levels (e.g., closing windows and doors) shall also be included in the notification. ► To the extent feasible, acoustic barriers (e.g., lead curtains, sound barriers) shall be constructed to reduce construction-generated noise levels at affected noise-sensitive land uses. The barriers shall be designed to obstruct the line of sight between the noise-sensitive land use and on-site construction equipment. When installed properly, acoustic barriers can reduce construction noise levels by approximately 8–10 dB (EPA 1971). ► When future noise sensitive uses are within close proximity to prolonged construction noise, noise-attenuating buffers such as structures, truck trailers, or soil piles shall be located between noise sources and future residences to shield sensitive receptors from construction noise. ► The primary contractor shall prepare and implement a construction noise management plan. This plan shall identify specific measures to ensure compliance with the noise control measures specified above. The noise control plan shall be submitted to the City of Folsom before any noise-generating construction activity begins. Construction shall not commence until the construction noise management plan is approved by the City of Folsom. Mitigation for the two off-site roadway connections into El Dorado County must be coordinated by the project applicant(s) of the applicable project phase with El Dorado County, since the roadway extensions are outside of the City of Folsom's jurisdictional boundaries.				
Mitigation Measure 3A.11-3: Implement Measures to Prevent Exposure of Sensitive Receptors to Groundborne Noise or Vibration from Project Generated Construction Activities. ► To the extent feasible, blasting activities shall not be conducted within 275 feet of existing or future sensitive receptors. ► To the extent feasible, bulldozing activities shall not be conducted within 50 feet of existing or future sensitive receptors. ► All blasting shall be performed by a blast contractor and blasting personnel licensed to operate in the State of California. ► A blasting plan, including estimates of vibration levels at the residence closest to the blast, shall be submitted to the enforcement agency for review and approval prior to the commencement of the first blast. ► Each blast shall be monitored and documented for groundbourne noise and vibration levels at the nearest sensitive land use and associated recorded submitted to the enforcement agency.	Before and during bulldozing and blasting activities on the SPA and within El Dorado Hills and the County of Sacramento	Project applicant(s) and primary contractor(s) of all project phases.	1. For all project-related improvements that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For the two roadway connections off-site into El Dorado Hills: El Dorado County Development Services Department. 3. For the off-site detention basin west of Prairie City Road: Sacramento County Planning and Community Development Department. 4. For the U.S. 50 interchange improvements: Caltrans.	
Mitigation Measure 3A.11-4: Implement Measures to Prevent Exposure of Sensitive Receptors to Increases in Noise from Project-Generated Operational Traffic on Off-site and On-Site Roadways. To meet applicable noise standards as set forth in the appropriate General Plan or Code (e.g., City of Folsom, County of Sacramento, and County of El Dorado) and to reduce increases in traffic-generated noise levels at noise-sensitive uses, the project applicant(s) of all project phases shall implement the following: ► Obtain the services of a consultant (such as a licensed engineer or licensed architect) to develop noise-attenuation measures for the proposed construction of on-site noise-sensitive land uses (i.e., residential dwellings and school classrooms) that will produce a minimum composite Sound Transmission Class (STC) rating for buildings of 30 or greater, individually computed for the walls and the floor/ceiling construction of buildings, for the proposed construction of on-site noise-sensitive land uses (i.e., residential dwellings and school classrooms). ► Prior to submittal of tentative subdivision maps and improvement plans, the project applicant(s) shall conduct a site-specific acoustical analysis to determine predicted roadway noise impacts attributable to the project, taking into account site-specific conditions (e.g., site design, location of structures, building characteristics). The acoustical analysis shall evaluate stationary- and mobile-source noise attributable to the proposed use or uses and impacts on nearby noise-sensitive land uses, in accordance with adopted City noise standards. Feasible measures shall be identified to reduce project-related noise impacts. These measures may include, but are not limited	During project construction activities at noise-sensitive receptors on the SPA; at the existing noise-sensitive receptors on Empire Ranch Road from Broadstone Parkway to Iron Point Road; and at the existing noise-sensitive receptors on Latrobe Road from White Rock Road to Golden Foothills Parkway	Project applicant(s) of all project phases.	1. For all noise-sensitive receptors that would be located within the City of Folsom: City of Folsom Community Development Department. 2. For all noise-sensitive receptors in El Dorado Hills: El Dorado County Development Services Department. 3. For all noise-sensitive receptors in the vicinity the off-site detention basin west of Prairie City Road:	

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to, the following: • limiting noise-generating operational activities associated with proposed commercial land uses, including truck deliveries; • constructing exterior sound walls; • constructing barrier walls and/or berms with vegetation; • using "quiet pavement" (e.g., rubberized asphalt) construction methods on local roadways; and, • using increased noise-attenuation measures in building construction (e.g., dual-pane, sound-rated windows; exterior wall insulation).			Sacramento County Planning and Community Development Department. 4. For all noise-sensitive receptors adjacent to the U.S. 50 interchange improvements: Caltrans.	
Mitigation Measure 3A.11-5: Implement Measures to Reduce Noise from Project-Generated Stationary Sources. The project applicant(s) for any particular discretionary development project shall implement the following measures to reduce the effect of noise levels generated by on-site stationary noise sources that would be located within 600 feet of any noise-sensitive receptor: ▸ Routine testing and preventive maintenance of emergency electrical generators shall be conducted during the less sensitive daytime hours (i.e., 7:00 a.m. to 6:00 p.m.). All electrical generators shall be equipped with noise control (e.g., muffler) devices in accordance with manufacturers' specifications. ▸ External mechanical equipment associated with buildings shall incorporate features designed to reduce noise emissions below the stationary noise source criteria. These features may include, but are not limited to, locating generators within equipment rooms or enclosures that incorporate noise-reduction features, such as acoustical louvers, and exhaust and intake silencers. Equipment enclosures shall be oriented so that major openings (i.e., intake louvers, exhaust) are directed away from nearby noise-sensitive receptors. ▸ Parking lots shall be located and designed so that noise emissions do not exceed the stationary noise source criteria established in this analysis (i.e., 50 dB for 30 minutes in every hour during the daytime [7 a.m. to 10 p.m.] and less than 45 dB for 30 minutes of every hour during the night time [10 p.m. to 7 a.m.]). Reduction of parking lot noise can be achieved by locating parking lots as far away as feasible from noise sensitive land uses, or using buildings and topographic features to provide acoustic shielding for noise-sensitive land uses. ▸ Loading docks shall be located and designed so that noise emissions do not exceed the stationary noise source criteria established in this analysis (i.e., 50 dB for 30 minutes in every hour during the daytime [7 a.m. to 10 p.m.] and less than 45 dB for 30 minutes of every hour during the night time [10 p.m. to 7 a.m.]). Reduction of loading dock noise can be achieved by locating loading docks as far away as possible from noise sensitive land uses, constructing noise barriers between loading docks and noise-sensitive land uses, or using buildings and topographic features to provide acoustic shielding for noise-sensitive land uses.	Before submittal of improvement plans for each project phase, and during project operations for testing of emergency generators.	Project applicant(s) of all project phases.	City of Folsom Community Development Department.	
3B.11 NOISE – WATER				
Mitigation Measure 3B.11-1a: Limit Construction Hours. Construction activities shall be limited to daylight hours between 7 a.m. and 7 p.m. Monday through Friday, and 9 a.m. and 5 p.m. on Saturday. No construction shall be allowed on Sundays or holidays.	During construction of all Off-site Water Facility components	City of Folsom Utilities Department	1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department. 2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department. 3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
Mitigation Measure 3B.11-1b: Minimize Noise from Construction Equipment and Staging. Construction equipment noise shall be minimized during project construction by muffling and shielding intakes and exhaust on construction equipment (per the manufacturer's specifications) and by shrouding or shielding impact tools, where used. The City's construction specifications shall also require that the contractor select staging areas as far as feasibly possible from sensitive receptors.	During construction of all Off-site Water Facility components	City of Folsom Utilities Department	1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department. 2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department. 3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.	
Mitigation Measure 3B.11-1c: Maximize the Use of Noise Barriers. Construction contractors shall locate fixed construction equipment (such as compressors and generators) and construction staging areas as far as possible from nearby residences. If feasible, noise barriers shall be used at the construction site and staging area. Temporary walls, stockpiles of excavated materials, or moveable sound barrier curtains would be appropriate in instances where construction noise would exceed 90 dBA and occur within less than 50 feet from a sensitive receptor. The final selection of noise barriers will be subject to the City's approval and shall provide a minimum 10 dBA reduction in construction noise levels.	During construction of all Off-site Water Facility components	City of Folsom Utilities Department	1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department. 2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department. 3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.	
Mitigation Measure 3B.11-1d: Prohibit Non-Essential Noise Sources During Construction. No amplified sources (e.g., stereo "boom boxes") shall be used in the vicinity of residences during project construction.	During construction of all Off-site Water Facility components	City of Folsom Utilities Department	1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department. 2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
			3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.	
Mitigation Measure 3B.11-1e: Monitor Construction Noise and Provide a Mechanism for Filing Noise Complaints. An on-site complaint and enforcement manager shall track and respond to noise complaints. The City shall also provide a mechanism for residents, businesses, and agencies to register complaints with the City if construction noise levels are overly intrusive or construction occurs outside the required hours.	During construction of all Off-site Water Facility components	City of Folsom Utilities Department	1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department. 2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department. 3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.	
Mitigation Measure 3B.11-3: Implement Operational Noise Minimization Measures. The following mitigation measures shall be implemented for the design of the WTP and the pump station(s) to ensure that operational noise levels at the property line do not exceed the City/County standards: ▸ Shielding and other specified measures as deemed appropriate and effective by the design engineer shall be incorporated into the design in order to comply with performance standards. ▸ Pumps located underground shall be shielded to not affect nearby sensitive receptors. ▸ Project equipment shall be outfitted and maintained with noise-reduction devices such as equipment closures, fan silencers, mufflers, acoustical louvers, noise barriers, and acoustical panels to minimize operational noise. ▸ Particularly noisy equipment shall be located as far away as feasibly possible from nearby sensitive receptors. ▸ The orientation of acoustical exits shall always be facing away from nearby sensitive receptors. ▸ Buildings and landscaping shall be incorporated, where possible, to absorb or redirect noise away from nearby sensitive receptors.	Approval of engineering plans for the On- or Off-site WTPs and Off-site booster pumping facilities prior to construction	City of Folsom Utilities Department	1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department. 2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department. 3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.	

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3B.12 PARKS AND RECREATION - WATER				
Mitigation Measure 3B.12-1: Provide for Continued Recreational Access as Identified in Mitigation Measure 3.14-1a. As part of the Traffic Control Plan identified in Mitigation Measure 3.14-1a, the City shall ensure that trail access is maintained throughout the construction period through the use of detours. Proper signage shall be included in multiple locations, where necessary, to provide advance notice to hikers and equestrian riders of up-comings construction activities.	Prior to and during construction activities	City of Folsom Utilities Department	1. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department. 2. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.	
3A.14 PUBLIC SERVICES - LAND				
Mitigation Measure 3A.14-1: Prepare and Implement a Construction Traffic Control Plan. The project applicant(s) of all project phases shall prepare and implement traffic control plans for construction activities that may affect road rights-of-way. The traffic control plans must follow any applicable standards of the agency responsible for the affected roadway and must be approved and signed by a professional engineer. Measures typically used in traffic control plans include advertising of planned lane closures, warning signage, a flagperson to direct traffic flows when needed, and methods to ensure continued access by emergency vehicles. During project construction, access to existing land uses shall be maintained at all times, with detours used as necessary during road closures. Traffic control plans shall be submitted to the appropriate City or County department or the California Department of Transportation (Caltrans) for review and approval before the approval of all project plans or permits, for all project phases where implementation may cause impacts on traffic. Mitigation for the off-site elements outside of the City of Folsom's jurisdictional boundaries must be coordinated by the project applicant(s) of each applicable project phase with the affected oversight agency(ies) (i.e., El Dorado and/or Sacramento Counties and Caltrans).	Before the approval of all relevant plans and/or permits and during construction of all project phases.	Project applicant(s) of all project phases.	1. For those roadways that would be annexed into the City of Folsom: City of Folsom Public Works Department. 2. For those roadways that would remain under the control of Sacramento County: Sacramento County Department of Transportation. 3. For the two off-site roadway connections into El Dorado Hills: El Dorado County Department of Transportation. 4. For U.S. 50 interchange improvements: Caltrans.	
Mitigation Measure 3A.14-2: Incorporate California Fire Code; City of Folsom Fire Code Requirements; and EDHFD Requirements, if Necessary, into Project Design and Submit Project Design to the City of Folsom Fire Department for Review and Approval. To reduce impacts related to the provision of new fire services, the project applicant(s) of all project phases shall do the following, as described below. 1. Incorporate into project designs fire flow requirements based on the California Fire Code, Folsom Fire Code (City of Folsom Municipal Code Title 8, Chapter 8.36), and other applicable requirements based on the City of Folsom Fire Department fire prevention standards. Improvement plans showing the incorporation automatic sprinkler systems, the availability of adequate fire flow, and the locations of hydrants shall be submitted to the City of Folsom Fire Department for review and approval. In addition, approved plans showing access design shall be provided to the City of Folsom Fire Department as described by Zoning Code Section 17.57.080 ("Vehicular Access Requirements"). These plans shall describe access-road length, dimensions, and finished surfaces for firefighting equipment. The installation of security gates across a fire apparatus access road shall be approved by the City of Folsom Fire Department. The design and operation of gates and barricades shall be in accordance with the Sacramento County Emergency Access Gates and Barriers Standard, as required by the City of Folsom Fire Code. 2. Submit a Fire Systems New Buildings, Additions, and Alterations Document Submittal List to the City of Folsom Community Development Department Building Division for review and approval before the issuance of building permits. In addition to the above measures, the project applicant(s) of all project phases shall incorporate the provisions described below for the	Before issuance of building permits and issuance of occupancy permits or final inspections for all project phases.	Project applicant(s) of all project phases.	City of Folsom Fire Department, and City of Folsom Community Development Department, and/or EDHFD for the portion of the SPA within the EDHFD service area.	

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portion of the SPA within the EDHFD service area, if it is determined through City/El Dorado County negotiations that EDHFD would serve the 178-acre portion of the SPA. 3. Incorporate into project designs applicable requirements based on the EDHFD fire prevention standards. For commercial development, improvement plans showing roadways, land splits, buildings, fire sprinkler systems, fire alarm systems, and other commercial building improvements shall be submitted to the EDHFD for review and approval. For residential development, improvement plans showing property lines and adjacent streets or roads; total acreage or square footage of the parcel; the footprint of all structures; driveway plan views describing width, length, turnouts, turnarounds, radiuses, and surfaces; and driveway profile views showing the percent grade from the access road to the structure and vertical clearance shall be submitted to the EDHFD for review and approval. 4. Submit a Fire Prevention Plan Checklist to the EDHFD for review and approval before the issuance of building permits. In addition, residential development requiring automation fire sprinklers shall submit sprinkler design sheet(s) and hydraulic calculations from a California State Licensed C-16 Contractor. The City shall not authorize the occupancy of any structures until the project applicant(s) have obtained a Certificate of Occupancy from the City of Folsom Community Development Department verifying that all fire prevention items have been addressed on-site to the satisfaction of the City of Folsom Fire Department and/or the EDHFD for the 178-acre area of the SPA within the EDHFD service area.				
Mitigation Measure 3A.14-3: Incorporate Fire Flow Requirements into Project Designs. The project applicant(s) of all project phases shall incorporate into their project designs fire flow requirements based on the California Fire Code, Folsom Fire Code, and/or EDHFD for those areas of the SPA within the EDHFD service area and shall verify to City of Folsom Fire Department that adequate water flow is available, prior to approval of improvement plans and issuance of occupancy permits or final inspections for all project phases.	Before issuance of building permits and issuance of occupancy permits or final inspections for all project phases.	Project applicant(s) of all project phases.	City of Folsom Fire Department, City of Folsom Community Development Department, and/or EDHFD for the 178-acre portion of the SPA within the EDHFD service area.	
3A.15 TRAFFIC AND TRANSPORTATION - LAND				
Project Participation in Funding Transportation Improvements a. Within and adjacent to the project boundaries, the Applicant shall construct all feasible physical improvements necessary and available to reduce the severity of the project's significant transportation-related impacts, which may be subject to fee credits and/or reimbursement, coordinated by the City, from other fee-paying development projects if available with respect to roads or other facilities that would also serve those non-project fee-paying development projects Funding of improvements on the perimeter of the project boundaries will be shared with other development/jurisdictions. b. Outside the project boundaries, the Applicant shall be responsible for the project's fair share of feasible physical improvements necessary and available to reduce the severity of the project's significant transportation-related impacts within the City of Folsom, in other jurisdictions and on State facilities, based on "cumulative plus project conditions." For purposes of this measure, "cumulative plus project conditions" refers to development authorized under the project as well as development consistent with approved general plans, specific plans, and other entitlements in the City and other jurisdictions. In cases where the project's fair share contribution is identified, the share will be based on the project's relative contribution to traffic growth under "cumulative plus project conditions." The project's contribution toward such improvements may take any, or some combination, of the following forms: 1. Construction of roads, road improvements, or other transportation facilities outside the boundaries of the project, subject in some instances to fee credit against other improvements necessitated by the project or future reimbursement, coordinated by the City, from other fee-paying development projects if available where the roads or improvements at issue would also serve those non-project fee paying development projects; 2. The payment of impact fees to the City of Folsom in amounts that constitute the project's fair share contributions to the construction of transportation facilities to be built or improved within the City, consistent with the City's Capital Improvement Program ("CIP"); 3. The payment of other adopted regional impact fees that would provide improvements to roadways, intersections and/or interchanges that are affected by multiple jurisdictions, except where the project applicant's payments of other fees or construction of improvements within the City of Folsom creates credit against the payment of regional impact fees; 4. The payment of impact fees to the City of Folsom in amounts that constitute the project's fair share contributions to the construction of transportation facilities and/or improvements within affected jurisdictions outside of Folsom, which payments to the City of Folsom and transmittal of fees to other agencies would occur through one or more enforceable agreements provided that for each required improvement, there is a reasonable mitigation plan that ensures that (i) the fees collected from the project will be used for				

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their intended purposes, and (ii) the improvements will actually be built within a reasonable period of time, and 5. The payment of impact fees to the City of Folsom in amounts that constitute the project's fair share contributions to the construction of transportation facilities and/or improvements on federal or state highways or freeways needed in part because of the project, to be made available to the California Department of Transportation ("Caltrans") if and when Caltrans and the City of Folsom enter into an enforceable agreement consistent with state law provided that, for each required improvement, Caltrans has a reasonable mitigation plan that ensures that (i) the fees collected from the project will be used for their intended purposes, and (ii) the improvements will actually be built within a reasonable period of time. c. In pursuing a single agreement or multiple agreements with any jurisdictions outside of the City of Folsom that will be affected by traffic from the project in order to effectuate proposed mitigation measures for improvements outside the City of Folsom, the City will seek to negotiate in good faith with these other jurisdictions to enter into fair and reasonable arrangements with the intention of achieving, within a reasonable time period after approval of the project's, commitments for (i) the provision of adequate "fair share" mitigation payments from the project for out-of-jurisdiction traffic impacts and impacts on federal and state freeways and highways, and (ii) reciprocal payments from regional development projects to the City of Folsom to address cumulative "fair share" mitigation payments towards federal and state freeways and highways for transportation-related facilities and/or improvements within the City of Folsom necessitated by the development within the region. It is intended that these agreements shall permit the participating agencies flexibility in providing cross-jurisdictional credits and reimbursements consistent with the general "fair share" mitigation standard, and require an updated model run incorporating the best available information in order to obtain the most accurate, up-to-date impact assessment feasible and to generate the most accurate, up-to-date estimates of regional fair share contributions. Best efforts should be made to secure funding from federal, state and regional sources. These agreements, moreover, should also include provisions that allow for periodic updates to the traffic modeling on which fair share payment calculations depend in order to account for (i) newly approved projects cumulatively contributing to transportation-related impacts and that therefore should contribute to the funding of necessary improvements (ii) additional physical improvements necessitated in whole or in part by newly approved projects, and (iii) changing cost calculations for the construction of needed improvements based on changes in the costs of materials, labor, and other inputs. d. If transportation improvements required to be constructed as mitigation are constructed prior to project implementation, the project will pay its fair share portion for those improvements. e. In considering individual projects within the project area (e.g., small-lot tentative subdivision maps or similar discretionary non-residential approvals), the City of Folsom shall identify required improvements, and shall base its calculations for such projects' fair share payments, based on the most recent traffic modeling (i.e., modeling that accounts for (i) newly approved projects cumulatively contributing to transportation-related impacts and that therefore should contribute to the funding of necessary improvements, (ii) additional physical improvements necessitated in whole or in part by newly approved projects, and (iii) changing cost calculations for the construction of needed improvements based on changes in the costs of materials, labor, and other inputs).				
Mitigation Measure 3A.15-1a: The Applicant Shall Pay a Fair Share to Fund the Construction of Improvements to the Folsom Boulevard/Blue Ravine Road Intersection (Intersection 1). To ensure that the Folsom Boulevard/Blue Ravine Road intersection operates at an acceptable LOS, the eastbound approach must be reconfigured to consist of two left-turn lanes, one through lane, and one right-turn lane. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the Folsom Boulevard/Blue Ravine Road intersection (Intersection 1).	A phasing analysis shall be performed prior to approval of the first subdivision map to determine when the improvement should be implemented and when fair share funding should be paid.	City of Folsom Public Works Department.	City of Folsom Public Works Department	
Mitigation Measure 3A.15-1b: The Applicant Shall Pay a Fair Share to Fund the Construction of Improvements at the Sibley Street/ Blue Ravine Road Intersection (Intersection 2). To ensure that the Sibley Street/Blue Ravine Road intersection operates at an acceptable LOS, the northbound approach must be reconfigured to consist of two left-turn lanes, two through lanes, and one right-turn lane. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the Sibley Street/Blue Ravine Road intersection (Intersection 2).	A phasing analysis shall be performed prior to approval of the first subdivision map to determine when the improvement should be implemented.	City of Folsom Public Works Department.	City of Folsom Public Works Department	

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Mitigation Measure 3A.I5-Ic: The Applicant Shall Fund and Construct Improvements to the Scott Road (West)/White Rock Road Intersection (Intersection 28). To ensure that the Scott Road (West)/White Rock Road intersection operates at an acceptable LOS, a traffic signal must be installed.	A phasing analysis shall be performed prior to approval of the first subdivision map to determine when the improvement should be implemented.	City of Folsom Public Works Department.	City of Folsom Public Works Department	
Mitigation Measure 3A.I5-Ie: Fund and Construct Improvements to the Hillside Drive/Easton Valley Parkway Intersection (Intersection 4I). To ensure that the Hillside Drive/Easton Valley Parkway intersection operates at an acceptable LOS, the eastbound approach must be reconfigured to consist of one dedicated left turn lane and two through lanes, and the westbound approach must be reconfigured to consist of two through lanes and one dedicated right-turn lane. The applicant shall fund and construct these improvements.	A phasing analysis shall be performed prior to approval of the first subdivision map to determine when the improvement should be implemented.	City of Folsom Public Works Department.	City of Folsom Public Works Department	
Mitigation Measure 3A.I5-1f: Fund and Construct Improvements to the Oak Avenue Parkway/Middle Road Intersection (Intersection 44). To ensure that the Oak Avenue Parkway/Middle Road intersection operates at an acceptable LOS, control all movements with a stop sign. The applicant shall fund and construct these improvements.	A phasing analysis shall be performed prior to approval of the first subdivision map to determine when the improvement should be implemented.	City of Folsom Public Works Department.	City of Folsom Public Works Department	
Mitigation Measure 3A.I5-1h: Participate in Fair Share Funding of Improvements to Reduce Impacts to the Hazel Avenue/Folsom Boulevard Intersection (Sacramento County Intersection 2). To ensure that the Hazel Avenue/Folsom Boulevard intersection operates at an acceptable LOS, this intersection must be grade separated including "jug handle" ramps. No at grade improvement is feasible. Grade separating and extended (south) Hazel Avenue with improvements to the U.S. 50/Hazel Avenue interchange is a mitigation measure for the approved Easton-Glenbrough Specific Plan development project. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to the Hazel Avenue/Folsom Boulevard intersection (Sacramento County Intersection 2).	A phasing analysis shall be performed prior to approval of the first subdivision map to determine when the improvement should be implemented.	Sacramento County Public Works Department and Caltrans.	Sacramento County Public Works Department and Caltrans	
Mitigation Measure 3A.I5-1i: Participate in Fair Share Funding of Improvements to Reduce Impacts on the Grant Line Road/White Rock Road Intersection and to White Rock Road widening between the Rancho Cordova City limit to Prairie City Road (Sacramento County Intersection 3). Improvements must be made to ensure that the Grant Line Road/White Rock Road intersection operates at an acceptable LOS. The currently County proposed White Rock Road widening project will widen and realign White Rock Road from the Rancho Cordova City limit to the El Dorado County line (this analysis assumes that the Proposed Project and build alternatives will widen White Rock Road to five lanes from Prairie City road to the El Dorado County Line). This widening includes improvements to the Grant Line Road intersection and realigning White Rock Road to be the through movement. The improvements include two eastbound through lanes, one eastbound right turn lane, two northbound left turn lanes, two northbound right turn lanes, two westbound left turn lanes and two westbound through lanes. This improvement also includes the signalization of the White Rock Road and Grant Line Road intersection. With implementation of this improvement, the intersection would operate at an acceptable LOS A. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to the Grant Line Road/White Rock Road intersection (Sacramento County Intersection 3).	Before project build out. Design of the White Rock Road widening to four lanes, from Grant Line Road to Prairie City Road, with intersection improvements has begun, and because this widening project is environmentally cleared and fully funded, it's construction is expected to be complete before the first phase of the Proposed Project or alternative is built.	Sacramento County Public Works Department.	Sacramento County Public Works Department	
Mitigation Measure 3A.I5-1j: Participate in Fair Share Funding of Improvements to Reduce Impacts on Hazel Avenue between Madison Avenue and Curragh Downs Drive (Roadway Segment I0). To ensure that Hazel Avenue operates at an acceptable LOS between Curragh Downs Drive and Gold Country Boulevard, Hazel Avenue must be widened to six lanes. This improvement is part of the County adopted Hazel Avenue widening project.	Before project build out. Construction of phase two of the Hazel Avenue widening, from	Sacramento County Public Works Department.	Sacramento County Public Works Department	

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	Madison Avenue to Curragh Downs Drive, is expected to be completed by year 2013, before the first phase of the Proposed Project or alternative is complete. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to Hazel Avenue between Madison Avenue and Curragh Downs Drive (Sacramento County Roadway Segment 10).			
Mitigation Measure 3A.15-1l: Participate in Fair Share Funding of Improvements to Reduce Impacts on the White Rock Road/Windfield Way Intersection (El Dorado County Intersection 3). To ensure that the White Rock Road/Windfield Way intersection operates at an acceptable LOS, the intersection must be signalized and separate northbound left and right turn lanes must be striped. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to the White Rock Road/Windfield Way intersection (El Dorado County Intersection 3).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	El Dorado County Department of Transportation.	El Dorado County Department of Transportation	
Mitigation Measure 3A.15-1o: Participate in Fair Share Funding of Improvements to Reduce Impacts on Eastbound U.S. 50 as an alternative to improvements at the Folsom Boulevard/U.S. 50 Eastbound Ramps Intersection (Caltrans Intersection 4). Congestion on eastbound U.S. 50 is causing vehicles to use Folsom Boulevard as an alternate parallel route until they reach U.S. 50, where they must get back on the freeway due to the lack of a parallel route. It is preferred to alleviate the congestion on U.S. 50 than to upgrade the intersection at the end of this reliever route. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to the Folsom Boulevard/U.S. 50 Eastbound Ramps intersection (Caltrans Intersection 4). To ensure that the Folsom Boulevard/U.S. 50 eastbound ramps intersection operates at an acceptable LOS, auxiliary lanes should be added to eastbound U.S. 50 from Hazel Avenue to east of Folsom Boulevard. This was recommended in the Traffic Operations Analysis Report for the U.S. 50 Auxiliary Lane Project.	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department and Sacramento County Department of Transportation	City of Folsom Public Works Department and Sacramento County Department of Transportation	
Mitigation Measure 3A.15-1p: Participate in Fair Share Funding of Improvements to Reduce Impacts on the Grant Line Road/ State Route 16 Intersection (Caltrans Intersection 12). To ensure that the Grant Line Road/State Route 16 intersection operates at an acceptable LOS, the northbound and southbound approaches must be reconfigured to consist of one left-turn lane and one shared through/right-turn lane. Protected left-turn signal phasing must be provided on the northbound and southbound approaches. Improvements to the Grant Line Road/State Route 16 intersection are contained within the County Development Fee Program, and are scheduled for Measure A funding. ► Improvements to this intersection must be implemented by Caltrans, Sacramento County, and the City of Rancho Cordova. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to the Grant Line Road/State Route 16 intersection (Caltrans Intersection 12).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	Sacramento County Department of Transportation and the City of Rancho Cordova Department of Public Works	Sacramento County Department of Transportation and the City of Rancho Cordova Department of Public Works	

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Mitigation Measure 3A.15-1q: Participate in Fair Share Funding of Improvements to Reduce Impacts on Eastbound U.S. 50 between Zinfandel Drive and Sunrise Boulevard (Freeway Segment 1). To ensure that Eastbound U.S. 50 operates at an acceptable LOS between Zinfandel Drive and Sunrise Boulevard, a bus-carpool (HOV) lane must be constructed. This improvement is currently planned as part of the Sacramento 50 Bus-Carpool Lane and Community Enhancements Project. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to Eastbound U.S. 50 between Zinfandel Drive and Sunrise Boulevard (Freeway Segment 1).	Before project build out. Construction of the Sacramento 50 Bus-Carpool Lane and Community Enhancements Project is expected to be completed by year 2013, before the first phase of the Proposed Project or alternative is complete. Construction of the Sacramento 50 Bus-Carpool Lane and Community Enhancements Project has started since the writing of the Draft EIS/EIR.	Caltrans	Caltrans	
Mitigation Measure 3A.15-1r: Participate in Fair Share Funding of Improvements to Reduce Impacts on Eastbound U.S. 50 between Hazel Avenue and Folsom Boulevard (Freeway Segment 3). To ensure that Eastbound U.S. 50 operates at an acceptable LOS between Hazel Avenue and Folsom Boulevard, an auxiliary lane must be constructed. This improvement was recommended in the Traffic Operations Analysis Report for the U.S. 50 Auxiliary Lane Project. This improvement is included in the proposed 50 Corridor Mobility Fee Program. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to Eastbound U.S. 50 between Hazel Avenue and Folsom Boulevard (Freeway Segment 3).	Before project build out. A phasing analysis should be performed to determine during which project phase the improvement should be built.	City of Folsom Public Works Department and Sacramento County Department of Transportation	City of Folsom Public Works Department and Sacramento County Department of Transportation	
Mitigation Measure 3A.15-1s: Participate in Fair Share Funding of Improvements to Reduce Impacts on Eastbound U.S. 50 between Folsom Boulevard and Prairie City Road (Freeway Segment 4). To ensure that Eastbound U.S. 50 operates at an acceptable LOS between Folsom Boulevard and Prairie City Road, an auxiliary lane must be constructed. This improvement was recommended in the Traffic Operations Analysis Report for the U.S. 50 Auxiliary Lane Project. This improvement is included in the proposed 50 Corridor Mobility Fee Program. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to Eastbound U.S. 50 between Folsom Boulevard and Prairie City Road (Freeway Segment 4).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department and Sacramento County Department of Transportation	City of Folsom Public Works Department and Sacramento County Department of Transportation	
Mitigation Measure 3A.15-1u: Participate in Fair Share Funding of Improvements to Reduce Impacts on Westbound U.S. 50 between Prairie City Road and Folsom Boulevard (Freeway Segment 16). To ensure that Westbound U.S. 50 operates at an acceptable LOS between Prairie City Road and Folsom Boulevard, an auxiliary lane must be constructed. This improvement was recommended in the Traffic Operations Analysis Report for the U.S. 50 Auxiliary Lane Project. This improvement is included in the proposed 50 Corridor Mobility Fee Program. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to Westbound U.S. 50 between Prairie City Road and Folsom Boulevard (Freeway Segment 16).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department and Sacramento County Department of Transportation	City of Folsom Public Works Department and Sacramento County Department of Transportation	
Mitigation Measure 3A.15-1v: Participate in Fair Share Funding of Improvements to Reduce Impacts on Westbound U.S. 50 between Hazel Avenue and Sunrise Boulevard (Freeway Segment 18). To ensure that Westbound U.S. 50 operates at an acceptable LOS between Hazel Avenue and Sunrise Boulevard, an auxiliary lane must be constructed. This improvement was recommended in the Traffic Operations Analysis Report for the U.S. 50 Auxiliary Lane Project, and included in the proposed Rancho Cordova Parkway interchange project. Improvements to this freeway segment must be implemented by Caltrans. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which	City of Rancho Cordova Department of Public Works and Sacramento County Department of Transportation	City of Rancho Cordova Department of Public Works and Sacramento County Department of Transportation	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
Westbound U.S. 50 between Hazel Avenue and Sunrise Boulevard (Freeway Segment 18).	project phase the improvement			
Mitigation Measure 3A.15-1w: Participate in Fair Share Funding of Improvements to Reduce Impacts on U.S. 50 Eastbound/Folsom Boulevard Ramp Merge (Freeway Merge 4). To ensure that Eastbound U.S. 50 operates at an acceptable LOS at the Folsom Boulevard merge, an auxiliary lane from the Folsom Boulevard merge to the Prairie City Road diverge must be constructed. This improvement was recommended in the Traffic Operations Analysis Report for the U.S. 50 Auxiliary Lane Project. This improvement is included in the proposed 50 Corridor Mobility Fee Program. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to the U.S. 50 Eastbound/Folsom Boulevard Ramp Merge (Freeway Merge 4).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department and Sacramento County Department of Transportation	City of Folsom Public Works Department and Sacramento County Department of Transportation	
Mitigation Measure 3A.15-1x: Participate in Fair Share Funding of Improvements to Reduce Impacts on U.S. 50 Eastbound/Prairie City Road Diverge (Freeway Diverge 5). To ensure that Eastbound U.S. 50 operates at an acceptable LOS at the Prairie City Road off-ramp diverge, an auxiliary lane from the Folsom Boulevard merge must be constructed. This improvement was recommended in the Traffic Operations Analysis Report for the U.S. 50 Auxiliary Lane Project. This auxiliary lane improvement is included in the proposed 50 Corridor Mobility Fee Program. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the U.S. 50 Eastbound/Prairie City Road diverge (Freeway Diverge 5).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department and Sacramento County Department of Transportation	City of Folsom Public Works Department and Sacramento County Department of Transportation	
Mitigation Measure 3A.15-1y: Participate in Fair Share Funding of Improvements to Reduce Impacts on U.S. 50 Eastbound/Prairie City Road Direct Merge (Freeway Merge 6). To ensure that Eastbound U.S. 50 operates at an acceptable LOS at the Prairie City Road on-ramp direct merge, an auxiliary lane to the East Bidwell Street – Scott Road diverge must be constructed. This auxiliary lane improvement is included in the proposed 50 Corridor Mobility Fee Program. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the U.S. 50 Eastbound/Prairie City Road direct merge (Freeway Merge 6).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department	City of Folsom Public Works Department	
Mitigation Measure 3A.15-1z: Participate in Fair Share Funding of Improvements to Reduce Impacts on U.S. 50 Eastbound/Prairie City Road Flyover On-Ramp to Oak Avenue Parkway Off-Ramp Weave (Freeway Weave 8). To ensure that Eastbound U.S. 50 operates at an acceptable LOS at the Prairie City Road flyover on-ramp to Oak Avenue Parkway off-ramp weave, an improvement acceptable to Caltrans should be implemented to eliminate the unacceptable weaving conditions. Such an improvement may involve a "braided ramp". The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the U.S. 50 Eastbound / Prairie City Road flyover on-ramp to Oak Avenue Parkway off-ramp weave (Freeway Weave 8).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department	City of Folsom Public Works Department	
Mitigation Measure 3A.15-1aa: Participate in Fair Share Funding of Improvements to Reduce Impacts on U.S. 50 Eastbound/Oak Avenue Parkway Loop Merge (Freeway Merge 9). To ensure that Eastbound U.S. 50 operates at an acceptable LOS at the Oak Avenue Parkway loop merge, an auxiliary lane to the East Bidwell Street – Scott Road diverge must be constructed. This auxiliary lane improvement is included in the proposed 50 Corridor Mobility Fee Program. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the U.S. 50 Eastbound/ Oak Avenue Parkway loop merge (Freeway Merge 9).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department	City of Folsom Public Works Department	

Table 1
Mitigation Monitoring and Reporting Plan for the Folsom South of U.S. Highway 50 Specific Plan Project

Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
Mitigation Measure 3A.15-1dd: Participate in Fair Share Funding of Improvements to Reduce Impacts on U.S. 50 Westbound/Empire Ranch Road Loop Ramp Merge (Freeway Merge 23). To ensure that Westbound U.S. 50 operates at an acceptable LOS, the northbound Empire Ranch Road loop on ramp should start the westbound auxiliary lane that ends at the East Bidwell Street – Scott Road off ramp. The slip on ramp from southbound Empire Ranch Road would merge into this extended auxiliary lane. Improvements to this freeway segment must be implementcd by Caltrans. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a ncxus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the U.S. 50 Westbound/Empire Ranch Road loop ramp merge (Freeway Merge 23).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department	City of Folsom Public Works Department	
Mitigation Measure 3A.15-1ee: Participate in Fair Share Funding of Improvements to Reduce Impacts on U.S. 50 Westbound/Oak Avenue Parkway Loop Ramp Merge (Freeway Merge 29). To ensure that Westbound U.S. 50 operates at an acceptable LOS, the northbound Oak Avenue Parkway loop on ramp should start the westbound auxiliary lane that ends at the Prairie City Road off ramp. The slip on ramp from southbound Oak Avenue Parkway would merge into this extended auxiliary lane. Improvements to this freeway segment must be implemented by Caltrans. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the U.S. 50 Westbound/Oak Avenue Parkway loop ramp merge (Freeway Merge 29).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department	City of Folsom Public Works Department	
Mitigation Measure 3A.15-1ff: Participate in Fair Share Funding of Improvements to Reduce Impacts oo U.S. 50 Westbound/Prairie City Road Loop Ramp Merge (Freeway Merge 32). To ensure that Westbound U.S. 50 operates at an acceptable LOS at the Prairie City Road loop ramp mergc, an auxiliary lane to the Folsom Boulevard off ramp diverge must be constructed. This auxiliary lane improvement is included in the proposed 50 Corridor Mobility Fee Program. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the U.S. 50 Wcstbound/Prairie City Road Loop Ramp Merge (Freeway Merge 32).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department and Sacramento County Department of Transportation	City of Folsom Public Works Department and Sacramento County Departmcnt of Transportation	
Mitigatioo Measure 3A.15-1gg: Participate in Fair Share Funding of Improvements to Reduce Impacts on U.S. 50 Westbound/Prairie City Road Direct Ramp Merge (Freeway Merge 33). To ensure that Westbound U.S. 50 operates at an acceptable LOS at the Prairie City Road direct ramp merge, an auxiliary lane to the Folsom Boulevard off ramp diverge must be constructed. This auxiliary lane improvement is included in the proposed 50 Corridor Mobility Fee Program. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and rcliable mechanism paid for by applicant, to reducc the impacts to the U.S. 50 Westbound/Prairie City Road direct ramp merge (Frecway Mcrge 33).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department and Sacramento County Department of Transportation	City of Folsom Public Works Department and Sacramento County Department of Transportation	
Mitigation Measure 3A.15-1bh: Participate in Fair Share Funding of Improvements to Reduce Impacts on U.S. 50 Eastbound/Fotsom Boulevard Diverge (Freeway Diverge 34). To ensure that Westbound U.S. 50 operates at an acceptable LOS at the Folsom Boulevard Diverge, an auxiliary lane from the Prairie City Road loop ramp merge must be constructed. Improvements to this freeway segment must be implemented by Caltrans. This auxiliary lane improvement is included in the proposed 50 Corridor Mobility Fee Program. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the U.S. 50 Eastbound / Folsom Boulevard diverge (Freeway Diverge 34).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department and Sacramento County Department of Transportation	City of Folsom Public Works Department and Sacramento County Department of Transportation	
Mitigation Measure 3A.15-1ii: Participate in Fair Share Funding of Improvements to Reduce Impacts on U.S. 50 Westbound/Hazet Avenue Direct Ramp Merge (Freeway Mcrge 38). To ensure that Westbound U.S. 50 operates at an acceptable LOS at the Hazel Avenue direct ramp merge, an auxiliary lane to the Sunrise Boulevard off ramp diverge must be constructed. This auxiliary lane improvement is included in the proposed 50 Corridor Mobility Fee Program. The applicant shall pay its proportionate share of funding of improvements to	Before project build out. A phasing analysis should be performed prior to approval of the	Sacramento County Department of Transportation and City of Rancho Cordova	Sacramento County Department of Transportation and City of Rancho Cordova Department of Public Works	

Table 1
Mitigation Monitoring and Reporting Plan for the Folsom South of U.S. Highway 50 Specific Plan Project

Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
the agency responsible for improvements, based on a program established by that agency to reduce the impacts to the U.S. 50 Westbound/Hazel Avenue direct ramp merge (Freeway Merge 38).	first subdivision map to determine during which project phase the improvement should be built.	Department of Public Works		
Mitigation Measure 3A.15-2a: Develop Commercial Support Services and Mixed-use Development Concurrent with Housing Development, and Develop and Provide Options for Alternative Transportation Modes. The project applicant(s) for any particular discretionary development application including commercial or mixed-use development along with residential uses shall develop commercial and mixed-use development concurrent with housing development, to the extent feasible in light of market realities and other considerations, to internalize vehicle trips. Pedestrian and bicycle facilities shall be implemented to the satisfaction of the City Public Works Department. To further minimize impacts from the increased demand on area roadways and intersections, the project applicant(s) for any particular discretionary development application involving schools or commercial centers shall develop and implement safe and secure bicycle parking to promote alternative transportation uses and reduce the volume of single-occupancy vehicles using area roadways and intersections.	Before approval of improvement plans for all project phases any particular discretionary development application that includes residential and commercial or mixed-use development.	City of Folsom and Applicant(s)	City of Folsom Public Works Department.	
The project applicant(s) for any particular discretionary development application shall participate in capital improvements and operating funds for transit service to increase the percent of travel by transit. The project's fair-share participation and the associated timing of the improvements and service shall be identified in the project conditions of approval and/or the project's development agreement. Improvements and service shall be coordinated, as necessary, with Folsom Stage Lines and Sacramento RT.	As a condition of project approval and/or as a condition of the development agreement for all project phases.	City of Folsom, Regional Transit, and Applicant(s)	City of Folsom Public Works Department.	
Mitigation Measure 3A.15-2b: Participate in the City's Transportation System Management Fee Program. The project applicant(s) for any particular discretionary development application shall pay an appropriate amount into the City's existing Transportation System Management Fee Program to reduce the number of single-occupant automobile travel on area roadways and intersections.	Concurrent with construction for all project phases.	City of Folsom and Applicant(s)	City of Folsom Public Works Department.	
Mitigation Measure 3A.15-2c: Participate with the 50 Corridor Transportation Management Association. The project applicant(s) for any particular discretionary development application shall join and participate with the 50 Corridor Transportation Management Association to reduce the number of single-occupant automobile travel on area roadways and intersections.	Concurrent with construction for all project phases.	50 Corridor Transportation Management Association and Applicant(s)	City of Folsom Public Works Department.	
Mitigation Measure 3A.15-3: Pay Full Cost of Identified Improvements that Are Not Funded by the City's Fee Program. In accordance with Measure W, the project applicant(s) for any particular discretionary development application shall provide fair-share contributions to the City's transportation impact fee program to fully fund improvements only required because of the Specific Plan.	As a condition of project approval and/or as a condition of the development agreement for all project phases.	City of Folsom and Applicant(s)	City of Folsom Public Works Department	
Mitigation Measure 3A.15-4a: The Applicant Shall Pay a Fair Share to Fund the Construction of Improvements to the Sibley Street/Blue Ravine Road Intersection (Folsom Intersection 2). To ensure that the Sibley Street/Blue Ravine Road intersection operates at a LOS D with less than the Cumulative No Project delay, the northbound approach must be reconfigured to consist of two left-turn lane, two through lanes, and one dedicated right-turn lane. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the Sibley Street/Blue Ravine Road intersection (Folsom Intersection 2).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department.	City of Folsom Public Works Department	
Mitigation Measure 3A.15-4b: The Applicant Shall Pay a Fair Share to Fund the Construction of Improvements to the Oak Avenue Parkway/East Bidwell Street Intersection (Folsom Intersection 6). To ensure that the Oak Avenue Parkway/East Bidwell Street intersection operates at an acceptable LOS, the eastbound (East Bidwell Street) approach must be reconfigured to consist of two left-turn lanes, four through lanes and a right-turn lane, and the westbound (East Bidwell Street) approach must be reconfigured to consist of two left-turn lanes, four through lanes, and a right-turn lane. It is against the City of Folsom policy to have eight lane roads because of the impacts to non motorized traffic and adjacent development; therefore, this improvement is infeasible.				

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
Mitigation Measure 3A.I5-4c: The Applicant Shall Pay a Fair Share to Fund the Construction of Improvements to the East Bidwell Strcct/College Street Intersection (Folsom Intersection 7). To ensure that the East Bidwell Street/College Street intersection operates at acceptable LOS C or better, the westbound approach must be reconfigured to consist of one left-turn lane, one left-through lane, and two dedicated right-turn lanes. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the East Bidwell Street/Nesmith Court intersection (Folsom Intersection 7).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department.	City of Folsom Public Works Department	
Mitigation Measure 3A,I5-4d: The Applicant Shall Pay a Fair Share to Fund the Construction of Improvements to thc East Bidwell Strcet/Iron Point Road Intersection (Folsom Intersection 21). To ensure that the East Bidwell Street /Iron Point Road intersection operates at an acceptable LOS, the northbound approach must be reconfigured to consist of two left-turn lanes, four through lanes and a right-turn lane, and the southbound approach must be reconfigured to consist of two left-turn lanes, four through lanes and a right-turn lane. It is against the City of Folsom policy to have eight lane roads because of the impacts to non motorized traffic and adjacent development; therefore, this improvement is infeasible.				
Mitigation Measure 3A.15-4c: The Applicant Shall Pay a Fair Sharc to Fund the Construction of Improvements to the Serpa Way/ Iron Point Road Intcrsection (Folsom Intersection 23). To improve LOS at thc Serpa Way/ Iron Point Road intersection, the northbound approaches must be restriped to consist of one left-turn lane, onc shared left-through lanes, and one right-turn lane. The applicant shall pay its proportionate share of funding of improvcmcnts, as may be determined by a nexus study or other appropriatc and reliable mechanism paid for by applicant, to reduce the impacts to the Serpa Way/Iron Point Road Intersection (Folsom Intcrsection 23).	Before project build out. A phasiug analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be build.	City of Folsom Public Works Department.	City of Folsom Public Works Department	
Mitigation Measurc 3A.15-4f: The Applicant Shall Pay a Fair Share to Fund the Construction of Improvements to the Empire Ranch Road/Iron Point Road Intersection (Folsom Intersection 24). To ensure that the Empire Ranch Road / Iron Point Road intersection operates at a LOS D or better, all of thc following improvements are required: ▸ The eastbound approach must be reconfigured to consist of onc left-turn lane, two through lanes, and a right-turn lane. ▸ The westbound approach must be reconfigured to consist of two left-turn lanes, one through lanc, and a through-right lane. ▸ The northbound approach must be reconfigured to consist of two left-turn lanes, three through lanes, and a right-turn lane. ▸ The southbound approach must be reconfigured to consist of two left-turn lancs, three through lanes, and a right-turn lane. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliablc mechanism paid for by applicant, to reduce the impacts to the Empire Ranch Road / Iron Point Road Intersection (Folsom Intersection 24).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department.	City of Folsom Public Works Department	
Mitigation Measure 3A.I5-4g: The Applicant Shall Fund and Construct Improvements to the Oak Avenue Parkway/Easton Valley Parkway Intersection (Folsom Intersection 33). To ensure that the Oak Avenue Parkway/Easton Valley Parkway intersection operates at an acceptable LOS the southbound approach must be reconfigured to consist of two left-turn lanes, two through lanes, and two right-turn lanes. The applicant shall fund and construct these improvements.	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department.	City of Folsom Public Works Department	
Mitigation Measure 3A.I5-4i: Participate in Fair Share Funding of Improvements to Reduce Impacts on the Grant Line Road/Whitc Rock Road Intersection (Sacramento County Intersection 3). To ensure that the Grant Linc Road/White Rock Road intersection operates at an acceptable LOS E or better this intersection should be replaced by some type of grade separated intersection or interchange. Improvements to this intersection are identified in the Sacramento County's Proposed General Plan. Implementation of these improvements would assist in reducing traffic impacts on this intersection by providing acceptable operation. Intersection improvements must be	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to	Sacramento County Department of Transportation.	Sacramento County Department of Transportation.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
implemented by Sacramento County. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to the Grant Line Road/White Rock Road Intersection (Sacramento County Intersection 3).	determine during which project phase the improvement should be built.			
Mitigation Measure 3A.15-4j: Participate in Fair Share Funding of Improvements to Reduce Impacts on Grant Line Road between White Rock Road and Kiefer Boulevard (Sacramento County Roadway Segments 5-7). To improve operation on Grant Line Road between White Rock Road and Kiefer Boulevard, this roadway segment must be widened to six lanes. This improvement is proposed in the Sacramento County and the City of Rancho Cordova General Plans; however, it is not in the 2035 MTP. Improvements to this roadway segment must be implemented by Sacramento County and the City of Rancho Cordova. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to Grant Line Road between White Rock Road and Kiefer Boulevard (Sacramento County Roadway Segments 5-7). The identified improvement would more than offset the impacts specifically related to the Folsom South of U.S. 50 project on this roadway segment.	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	Sacramento County Department of Transportation.	Sacramento County Department of Transportation.	
Mitigation Measure 3A.15-4k: Participate in Fair Share Funding of Improvements to Reduce Impacts on Grant Line Road between Kiefer Boulevard and Jackson Highway (Sacramento County Roadway Segment 8). To improve operation on Grant Line Road between Kiefer Boulevard Jackson Highway, this roadway segment could be widened to six lanes. This improvement is proposed in the Sacramento County and the City of Rancho Cordova General Plans; however, it is not in the 2035 MTP. Improvements to this roadway segment must be implemented by Sacramento County and the City of Rancho Cordova. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to Grant Line Road between Kiefer Boulevard and Jackson Highway (Sacramento County Roadway Segment 8). The identified improvement would more than offset the impacts specifically related to the Folsom South of U.S. 50 project on this roadway segment.	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	Sacramento County Department of Transportation.	Sacramento County Department of Transportation.	
Mitigation Measure 3A.15-4l: Participate in Fair Share Funding of Improvements to Reduce Impacts on Hazel Avenue between Curragh Downs Drive and U.S. 50 Westbound Ramps (Sacramento County Roadway Segment s 12-13). To improve operation on Hazel Avenue between Curragh Downs Drive and the U.S. 50 westbound ramps, this roadway segment could be widened to eight lanes. This improvement is inconsistent with Sacramento County's general plan because the county's policy requires a maximum roadway cross section of six lanes. Analysis shown later indicates that improvements at the impacted intersection in this segment can be mitigated (see Mitigation Measure 3A.15-4q). Improvements to impacted intersections on this segment will improve operations on this roadway segment and, therefore; mitigate this segment impact. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to Hazel Avenue between Curragh Downs Drive and U.S. 50 Westbound Ramps (Sacramento County Roadway Segments 12-13).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	Sacramento County Department of Transportation.	Sacramento County Department of Transportation.	
Mitigation Measure 3A.15-4m: Participate in Fair Share Funding of Improvements to Reduce Impacts on White Rock Road between Grant Line Road and Prairie City Road (Sacramento County Roadway Segment 22). To improve operation on White Rock Road between Grant Line Road and Prairie City Road, this roadway segment must be widened to six lanes. This improvement is included in the 2035 MTP but is not included in the Sacramento County General Plan. Improvements to this roadway segment must be implemented by Sacramento County. The identified improvement would more than offset the impacts specifically related to the Folsom South of U.S. 50 project on this roadway segment. However, because of other development in the region that would substantially increase traffic levels, this roadway segment would continue to operate at an unacceptable LOS F even with the capacity improvements identified to mitigate Folsom South of U.S. 50 impacts. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to White Rock Road between Grant Line Road and Prairie City Road (Sacramento County Roadway Segment 22).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	Sacramento County Department of Transportation.	Sacramento County Department of Transportation.	
Mitigation Measure 3A.15-4n: Participate in Fair Share Funding of Improvements to Reduce Impacts on White Rock Road between Empire Ranch Road and Carson Crossing Road (Sacramento County Roadway Segment 28). To improve operation on White Rock Road between Empire Ranch Road and Carson Crossing Road, this roadway segment must be widened to six lanes. Improvements to this roadway segment must be implemented by Sacramento County. The applicant shall pay its proportionate share of funding of improvements to	Before project build out. A phasing analysis should be performed prior to approval of the	Sacramento County Department of Transportation.	Sacramento County Department of Transportation.	

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Mitigation Measure	**Timing**	**Implementation**	**Enforcement**	**Dated Signature for Verification of Compliance**
the agency responsible for improvements, based on a program established by that agency to reduce the impacts to White Rock Road between Empire Ranch Road and Carson Crossing Road (Sacramento County Roadway Segment 28).	first subdivision map to determine during which project phase the improvement should be built.			
Mitigation Measure 3A.15-4o: Participate in Fair Share Funding of Improvements to Reduce Impacts on the White Rock Road/Carson Crossing Road Intersection (El Dorado County 1). To ensure that the White Rock Road/Carson Crossing Road intersection operates at an acceptable LOS, the eastbound right turn lane must be converted into a separate free right turn lane, or double right. Improvements to this intersection must be implemented by El Dorado County. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to the White Rock Road/Carson Crossing Road Intersection (El Dorado County 1).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	El Dorado County Department of Public Works.	El Dorado County Department of Public Works.	
Mitigation Measure 3A.15-4p: Participate in Fair Share Funding of Improvements to Reduce Impacts on the Hazel Avenue/U.S. 50 Westbound Ramps Intersection (Caltrans Intersection 1). To ensure that the Hazel Avenue/U.S. 50 westbound ramps intersection operates at an acceptable LOS, the westbound approach must be reconfigured to consist of one dedicated left turn lane, one shared left-through lane and three dedicated right-turn lanes. Improvements to this intersection must be implemented by Caltrans and Sacramento County. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to the Hazel Avenue/U.S. 50 Westbound Ramps Intersection (Caltrans Intersection 1).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	Sacramento County Department of Transportation.	Sacramento County Department of Transportation.	
Mitigation Measure 3A.15-4q: Participate in Fair Share Funding of Improvements to Reduce Impacts on Eastbound US 50 between Zinfandel Drive and Sunrise Boulevard (Freeway Segment 1). To ensure that Eastbound US 50 operates at an acceptable LOS between Zinfandel Drive and Sunrise Boulevard, an additional eastbound lane could be constructed. This improvement is not consistent with the Concept Facility in Caltrans State Route 50 Corridor System Management Plan; therefore, it is not likely to be implemented by Caltrans by 2030. Construction of the Capitol South East Connector, including widening White Rock Road and Grant Line Road to six lanes with limited access, could divert some traffic from U.S. 50 and partially mitigate the project's impact. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to Eastbound U.S. 50 between Zinfandel Drive and Sunrise Boulevard (Freeway Segment 1).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	Capitol Southeast Connecter Joint Powers Authority.	Capitol Southeast Connecter Joint Powers Authority.	
Mitigation Measure 3A.15-4r: Participate in Fair Share Funding of Improvements to Reduce Impacts on Eastbound US 50 between Rancho Cordova Parkway and Hazel Avenue (Freeway Segment 3). To ensure that Eastbound US 50 operates at an acceptable LOS between Rancho Cordova Parkway and Hazel Avenue, an additional eastbound lane could be constructed. This improvement is not consistent with the Concept Facility in Caltrans State Route 50 Corridor System Management Plan; therefore, it is not likely to be implemented by Caltrans by 2030. Construction of the Capitol South East Connector, including widening White Rock Road and Grant Line Road to six lanes with limited access, could divert some traffic off of U.S. 50 and partially mitigate the project's impact. The applicant shall pay its proportionate share of funding of improvements to the agency responsible for improvements, based on a program established by that agency to reduce the impacts to Eastbound U.S. 50 between Rancho Cordova Parkway and Hazel Avenue (Freeway Segment 3).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	Capitol Southeast Connecter Joint Powers Authority.	Capitol Southeast Connecter Joint Powers Authority.	
Mitigation Measure 3A.15-4s: Participate in Fair Share Funding of Improvements to Reduce Impacts on Eastbound US 50 between Folsom Boulevard and Prairie City Road (Freeway Segment 5). To ensure that Eastbound US 50 operates at an acceptable LOS between Folsom Boulevard and Prairie City Road, the eastbound auxiliary lane should be converted to a mixed flow lane that extends to and drops at the Oak Avenue Parkway off ramp (see mitigation measure 3A.15-4t). Improvements to this freeway segment must be implemented by Caltrans. This improvement is not consistent with the Concept Facility in Caltrans State Route 50 Corridor System Management Plan; therefore, it is not likely to be implemented by Caltrans by 2030. Construction of the Capitol South East Connector, including widening White Rock Road and Grant Line Road to six lanes with limited	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the	Capitol Southeast Connecter Joint Powers Authority.	Capitol Southeast Connecter Joint Powers Authority.	

Table 1 Mitigation Monitoring and Reporting Plan for the Folsom South of U.S. Highway 50 Specific Plan Project				
Mitigation Measure	**Timing**	**Implementation**	**Enforcement**	**Dated Signature for Verification of Compliance**
access, could divert some traffic off of U.S. 50 and partially mitigate the project's impact. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to Eastbound U.S. 50 between Folsom Boulevard and Prairie City Road (Freeway Segment 5).	improvement should be built.			
Mitigation Measure 3A.15-4t: Participate in Fair Share Funding of Improvements to Reduce Impacts on Eastbound US 50 between Prairie City Road and Oak Avenue Parkway (Freeway Segment 6). To ensure that Eastbound US 50 operates at an acceptable LOS between Prairie City Road and Oak Avenue Parkway, the northbound Prairie City Road slip on ramp should merge with the eastbound auxiliary lane that extends to and drops at the Oak Avenue Parkway off ramp (see Mitigation Measures 3A.15-4u, v and w), and the southbound Prairie City Road flyover on ramp should be braided over the Oak Avenue Parkway off ramp and start an extended full auxiliary lane to the East Bidwell Street – Scott Road off ramp. Improvements to this freeway segment must be implemented by Caltrans. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to Eastbound U.S. 50 between Prairie City Road and Oak Avenue Parkway (Freeway Segment 6).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department	City of Folsom Public Works Department	
Mitigation Measure 3A.15-4u: Participate in Fair Share Funding of Improvements to Reduce Impacts on the U.S. 50 Eastbound / Prairie City Road Slip Ramp Merge (Freeway Merge 6). To ensure that Eastbound US 50 operates at an acceptable LOS, the northbound Prairie City Road slip on ramp should start the eastbound auxiliary lane that extends to and drops at the Oak Avenue Parkway off ramp (see mitigation measure 3A.15-4u, w and x), and the southbound Prairie City Road flyover on ramp should be braided over the Oak Avenue Parkway off ramp and start an extended full auxiliary lane to the East Bidwell Street – Scott Road off ramp. Improvements to this freeway segment must be implemented by Caltrans. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the U.S. 50 Eastbound / Prairie City Road slip ramp merge (Freeway Merge 6).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department.	City of Folsom Public Works Department.	
Mitigation Measure 3A.15-4v: Participate in Fair Share Funding of Improvements to Reduce Impacts on the U.S. 50 Eastbound / Prairie City Road Flyover On Ramp to Oak Avenue Parkway Off Ramp Weave (Freeway Weave 7). To ensure that Eastbound US 50 operates at an acceptable LOS, the northbound Prairie City Road slip on ramp should start the eastbound auxiliary lane that extends to and drops at the Oak Avenue Parkway off ramp (see mitigation measure 3A.15-4u, v and x), and the southbound Prairie City Road flyover on ramp should be braided over the Oak Avenue Parkway off ramp and start an extended full auxiliary lane to the East Bidwell Street – Scott Road off ramp. Improvements to this freeway segment must be implemented by Caltrans. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the U.S. 50 Eastbound / Prairie City Road Flyover On Ramp to Oak Avenue Parkway Off Ramp Weave (Freeway Weave 7).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department.	City of Folsom Public Works Department.	
Mitigation Measure 3A.15-4w: Participate in Fair Share Funding of Improvements to Reduce Impacts on U.S. 50 Eastbound / Oak Avenue Parkway Loop Ramp Merge (Freeway Merge 8). To ensure that Eastbound US 50 operates at an acceptable LOS, the southbound Oak Avenue Parkway loop on ramp should merge with the eastbound auxiliary lane that starts at the southbound Prairie City Road braided flyover on ramp and ends at the East Bidwell Street – Scott Road off ramp (see mitigation measure 3A.15-4u, v and w). Improvements to this freeway segment must be implemented by Caltrans. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to U.S. 50 Eastbound / Oak Avenue Parkway Loop Ramp Merge (Freeway Merge 8).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department.	City of Folsom Public Works Department.	
Mitigation Measure 3A.15-4x: Participate in Fair Share Funding of Improvements to Reduce Impacts on U.S. 50 Westbound / Empire Ranch Road Loop Ramp Merge (Freeway Merge 27). To ensure that Westbound US 50 operates at an acceptable LOS, the northbound Empire Ranch Road loop on ramp should start the westbound auxiliary lane that ends at the East Bidwell Street – Scott Road off ramp. The slip on ramp from southbound Empire Ranch Road slip ramp would merge into this extended auxiliary lane. Improvements to this freeway segment must be implemented by Caltrans. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the U.S. 50 Westbound / Empire Ranch Road loop ramp merge (Freeway Merge 27).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department.	City of Folsom Public Works Department.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
Mitigation Measure 3A.15-4y: Participate in Fair Share Funding of Improvements to Reduce Impacts on U.S. 50 Westbound / Prairie City Road Loop Ramp Merge (Freeway Merge 35). To ensure that Westbound US 50 operates at an acceptable LOS, the northbound Prairie City Road loop on ramp should start the westbound auxiliary lane that continues beyond the Folsom Boulevard off ramp. The slip on ramp from southbound Prairie City Road slip ramp would merge into this extended auxiliary lane. Improvements to this freeway segment must be implemented by Caltrans. The applicant shall pay its proportionate share of funding of improvements, as may be determined by a nexus study or other appropriate and reliable mechanism paid for by applicant, to reduce the impacts to the U.S. 50 Westbound / Prairie City Road Loop Ramp Merge (Freeway Merge 35).	Before project build out. A phasing analysis should be performed prior to approval of the first subdivision map to determine during which project phase the improvement should be built.	City of Folsom Public Works Department and Sacramento County Department of Transportation.	City of Folsom Public Works Department and Sacramento County Department of Transportation.	
3B.15 TRAFFIC AND TRANSPORTATION - WATER				
Mitigation Measure 3B.15-1a: Prepare Traffic Control Plan. Prior to construction, the City shall prepare a Traffic Control Plan for roadways and intersections affected by Off-site Water Facilities-related construction. The Traffic Control Plan shall designate haul routes and comply with requirements in the encroachment permits issued by the City of Rancho Cordova, Sacramento County, and Caltrans. The Traffic Control Plan to be prepared by the construction contractor(s) shall, at minimum, include the following measures: ▸ Maintaining the maximum amount of travel lane capacity during non-construction periods, possible, and advanced notice to drivers through the provision of construction signage. ▸ Maintaining alternate one-way traffic flow past the lay down area and site access when feasible. ▸ Heavy trucks and other construction transport vehicles shall avoid the busiest commute hours (7 a.m. to 8 a.m. and 5 p.m. to 6 p.m. on weekdays). ▸ The City shall provide a minimum 72-hour advance notice of access restrictions for residents, businesses, and local emergency response agencies. This shall include the identification of alternative routes and detours to enable for the avoidance of the immediate construction zone. ▸ The City, in cooperation with its contractor(s), shall provide a phone number and community contact for inquiries about the schedule of the Off-site Water Facilities throughout the construction period. This information will be posted in a local newspaper, via the City's web site, or at City Hall and will be updated on a monthly basis. ▸ To the extent practical depending the alignment of the selected Off-site Water Facility Alternative, the City shall maximize opportunities for coordinated construction and installation of the conveyance pipeline with other planned roadway improvement projects.	Prior to and during construction of all Off-site Water Facilities	City of Folsom Utilities Department	1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department. 2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department. 3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.	
Mitigation Measure 3B.15-1b: Assess Pre-Off-site Water Facilities Roadway Conditions. Prior to construction, the City's construction contractor(s) shall be responsible for assessing current road conditions for Off-site Water Facilities-related haul routes including the local access roads and develop post construction road restoration requirements. As part of the encroachment permitting process, an agreement shall be entered into with applicable jurisdictions prior to construction that details post construction road restoration requirements. Staff with the City of Rancho Cordova and Sacramento County shall review the post construction restoration standards for each of the affected roadways. The City shall perform roadway repairs or rehabilitation as necessary such that post construction requirements are met.	Prior to and during construction of all Off-site Water Facilities	City of Folsom Utilities Department	1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department. 2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department. 3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
3A.16 UTILITIES AND SERVICE SYSTEMS - LAND				
Mitigation Measure 3A.16-1: Submit Proof of Adequate On- and Off-Site Wastewater Conveyance Facilities and Implement On- and Off-Site Infrastructure Service Systems or Ensure That Adequate Financing Is Secured. Before the approval of the final map and issuance of building permits for all project phases, the project applicant(s) of all project phases shall submit proof to the City of Folsom that an adequate wastewater conveyance system either has been constructed or is ensured through payment of the City's facilities augmentation fee as described under the Folsom Municipal Code Title 3, Chapter 3.40, "Facilities Augmentation Fee – Folsom South Area Facilities Plan," or other sureties to the City's satisfaction. Both on-site wastewater conveyance infrastructure and off-site force main sufficient to provide adequate service to the project shall be in place for the amount of development identified in the tentative map before approval of the final map and issuance of building permits for all project phases, or their financing shall be ensured to the satisfaction of the City.	Before approval of final maps and issuance of building permits for any project phases.	The project applicant(s) of all project phases.	City of Folsom Community Development Department and City of Folsom Public Works Department.	
Mitigation Measure 3A.16-3: Demonstrate Adequate SRWTP Wastewater Treatment Capacity. The project applicant(s) of all project phases shall demonstrate adequate capacity at the SRWTP for new wastewater flows generated by the project. This shall involve preparing a tentative map–level study and paying connection and capacity fees as identified by SRCSD. Approval of the final map and issuance of building permits for all project phases shall not be granted until the City verifies adequate SRWTP capacity is available for the amount of development identified in the tentative map.	Before approval of final maps and issuance of building permits for any project phases.	The project applicant(s) of all project phases.	City of Folsom Community Development Department and City of Folsom Public Works Department.	
Mitigation Measure 3A.16-4: Submit Proof of Adequate EID Off-Site Wastewater Conveyance Facilities and Implement EID Off-Site Infrastructure Service Systems or Ensure That Adequate Financing Is Secured. Before the approval of the final map and issuance of building permits for all project phases, the project applicant(s) of all project phases shall obtain proof from EID that an adequate wastewater conveyance system either has been constructed or is ensured through the use of bonds or other sureties. The project applicants of all project phases shall submit this proof to the City of Folsom. EID off-site wastewater conveyance infrastructure sufficient to provide adequate service to project shall be in place for the amount of development identified in the tentative map before approval of the final map and issuance of building permits for all project phases, and before issuance of occupancy permits, or their financing shall be ensured to the satisfaction of the City.	Before approval of final maps and issuance of building permits for any project phase	The project applicant(s) of all project phases..	City of Folsom Community Development Department and City of Folsom Public Works Department.	
Mitigation Measure 3A.16-5: Demonstrate Adequate El Dorado Hills Wastewater Treatment Plant Capacity. The project applicant(s) of all project phases shall demonstrate adequate capacity at the El Dorado Hills WWTP for new wastewater flows generated by project development. This shall involve preparing a tentative map–level study and paying connection and capacity fees as identified by EID. Approval of the final map and issuance of building permits for all project phases shall not be granted until the City verifies adequate El Dorado Hills WWTP capacity is available for the amount of development identified in the tentative map.	Before approval of final maps and issuance of building permits for any project phases involving the El Dorado Hills WWTP.	The project applicant(s) of all project phases.	City of Folsom Community Development Department and City of Folsom Public Works Department.	
3B.16 UTILITIES AND SERVICE SYSTEMS - WATER				
Mitigation Measure 3B.16-3a: Minimize Utility Conflicts by Implementing an Underground Services Alert. Underground utilities and service connections shall be identified prior to commencing any excavation work through the implementation of an Underground Services Alert (USA). The exact utility locations will be determined by hand-excavated test pits dug at locations determined and approved by the construction manager (also referred to as "pot-holing"). Temporary disruption of service may be required to allow for construction. No service on such lines would be disrupted until prior approval is received from the construction manager and the service provider.	Prior to construction of all Off-site Water Facilities	City of Folsom Utilities Department	City of Folsom Utilities Department	
Mitigation Measure 3B.16-3b: Coordinate with Utility Providers and Implement Appropriate Installation Methods to Minimize Potential Utility Service Disruptions. Prior to installation, the City shall consult with SCWA, SRCSD, CSD-1, and PG&E to determine proper installation methods and final design criteria to minimize the potential for disruptions to existing and planned utilities.	Prior to construction of all Off-site Water Facilities	City of Folsom Utilities Department	City of Folsom Utilities Department	
3B.17 GROUNDWATER - WATER				
Mitigation Measure 3B.17-1a: Implement Construction Dewatering Best Management Practices. During construction at site locations containing high groundwater, if groundwater from dewatering activities cannot be contained within the construction area (e.g. pipeline corridor, WTP), it shall be pumped to an authorized onsite land area, existing detention facilities, or Baker tanks or equivalent with sufficient capacity to control the volume of groundwater. Tanks shall be equipped with either a gel coagulant, a filter system, or other containment to remove sediment. The Off-site Water Facilities Stormwater Pollution Prevention Plan (SWPPP) shall include BMPs, as appropriate, to retain, treat, and dispose of groundwater from dewatering activities. Measures shall include, but not limited to, the	Prior to and during construction	City of Folsom Utilities Department	1. California Department of Fish and Game or Regional Water Quality Control Board 2. City of Folsom Community Development Department.	

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following: ▸ temporarily retain pumped groundwater, as appropriate, to reduce turbidity and concentrations of suspended sediments before discharge to surface waterways; ▸ convey pumped groundwater to a suitable land disposal area capable of percolating flows; and/or ▸ incorporate other applicable measures from the Caltrans Storm Water Quality Handbook, Section 7: Dewatering Operations (2004).			3. Sacramento County Planning Department or City of Rancho Cordova Planning Department for improvements within their respective jurisdictions.	
Mitigation Measure 3B.17-1b: Implement a Dewatering Discharge Monitoring Program. A groundwater discharge monitoring program shall be implemented to ensure that receiving water quality does not exceed levels that would impact aquatic resources and agricultural use. If monitoring reveals that water quality would impact these beneficial uses, discharges to surface waterways shall be reduced or diluted to acceptable levels, or terminated. If discharges are reduced or terminated, groundwater shall be disposed through land application. Groundwater collected during dewatering shall he tested for contamination prior to disposal and comply with Central Valley RWQCB requirements.	Prior to and during construction	City of Folsom Utilities Department	1. California Department of Fish and Game or Regional Water Quality Control Board 2. City of Folsom Community Development Department. 3. Sacramento County Planning Department or City of Rancho Cordova Planning Department for improvements within their respective jurisdictions.	
3A.18 WATER SUPPLY - LAND				
Mitigation Measure 3A.18-1: Submit Proof of Surface Water Supply Availability. a. Prior to approval of any small-lot tentative subdivision map subject to Government Code Section 66473.7 (SB 221), the City shall comply with that statute. Prior to approval of any small-lot tentative subdivision map for a proposed residential project not subject to that statute, the City need not comply with Section 66473.7, or formally consult with any public water system that would provide water to the affected area; nevertheless, the City shall make a factual showing or impose conditions similar to those required by Section 66473.7 to ensure an adequate water supply for development authorized by the map. b. Prior to recordation of each final subdivision map, or prior to City approval of any similar project-specific discretionary approval or entitlement required for nonresidential uses, the project applicant(s) of that project phase or activity shall demonstrate the availability of a reliable and sufficient water supply from a public water system for the amount of development that would be authorized by the final subdivision map or project-specific discretionary nonresidential approval or entitlement. Such a demonstration shall consist of information showing that both existing sources are available or needed supplies and improvements will be in place prior to occupancy.	Before approval of final maps and issuance of building permits for any project phases.	The project applicant(s) of all project phases.	City of Folsom Community Development Department and City of Folsom Public Works Department.	
Mitigation Measure 3A.18-2a: Submit Proof of Adequate Off-Site Water Conveyance Facilities and Implement Off-Site Infrastructure Service System or Ensure That Adequate Financing Is Secured. Before the approval of the final subdivision map and issuance of building permits for all project phases, the project applicant(s) of any particular discretionary development application shall submit proof to the City of Folsom that an adequate off-site water conveyance system either has been constructed or is ensured or other sureties to the City's satisfaction. The off-site water conveyance infrastructure sufficient to provide adequate service to the project shall be in place for the amount of development identified in the tentative map before approval of the final subdivision map and issuance of building permits for all project phases, or their financing shall be ensured to the satisfaction of the City. A certificate of occupancy shall not be issued for any building within the SPA until the water conveyance infrastructure sufficient to serve such building has been constructed and is in place.	Before approval of final maps and issuance of building permits for any project phases.	The project applicant(s) for any particular discretionary development application.	City of Folsom Community Development Department and City of Folsom Public Works Department.	
Mitigation Measure 3A.18-2b: Demonstrate Adequate Off-Site Water Treatment Capacity (if the Off-Site Water Treatment Plant Option is Selected). If an off-site water treatment plant (WTP) alternative is selected (as opposed to the on-site WTP alternative), the project applicant(s) for any particular discretionary development application shall demonstrate adequate capacity at the off-site WTP. This shall involve preparing a tentative map–level study and paying connection and capacity fees as determined by the City. Approval of the final project map shall not be granted until the City verifies adequate water treatment capacity either is available or is certain to be available when needed for the amount of development identified in the tentative map before approval of the final map and issuance of building permits for all project phases. A certificate of occupancy shall not be issued for any building within the SPA until the water treatment capacity sufficient to serve such	Before approval of final maps and issuance of building permits for any project phases.	The project applicant(s) for any particular discretionary development application.	City of Folsom Community Development Department and City of Folsom Public Works Department.	

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Mitigation Measure	Timing	Implementation	Enforcement	Dated Signature for Verification of Compliance
building has been constructed and is in place.				
CUMULATIVE - LAND				
Cumulative Mitigation Measure AIR-1-Land: Implement East Sacramento Regional Aggregate Mining Truck Management Plan or Other Measures to Reduce Exposure of Sensitive Receptors to Operational Emissions of Toxic Air Contaminants from Quarry Truck Traffic. The City of Folsom is a participant in the development of an East Sacramento Regional Aggregate Mining Truck Management Plan (TMP), a cooperative effort led by the County of Sacramento, with the input of the City of Folsom, the City of Rancho Cordova and other interested parties, including representatives of quarry project applicants. When the County Board of Supervisors approved entitlements for the Teichert quarry project in November 2010, it also adopted conditions of approval and a development agreement that requires Teichert's participation in, and fair share funding of, a TMP to implement roadway capacity and safety improvements required to improve the compatibility of truck traffic from the quarries with the future urban development in the Folsom Specific Plan area and other jurisdictions that will be affected by quarry truck traffic. The development agreement adopted by the County for the Teichert project imposes limits on the amounts of annual aggregate sales from Teichert's facility until a TMP is adopted. The City of Folsom does not have direct jurisdiction over the Teichert, DeSilva Gates, or Walltown quarry project applicants as these projects are located within the unincorporated portion of the County. The County, as the agency with the primary authority over the quarries, has indicated that it intends to prepare an environmental analysis in accordance with CEQA prior to adoption of a TMP. The City's authority to control the activities of the quarry trucks includes restrictions or other actions, such as the approval and implementation of specialized road improvements to accommodate quarry truck traffic, that would be applicable within the City's jurisdictional boundaries. For the foregoing reasons, the City of Folsom considers itself a "responsible agency" (as that term is defined at State CEQA Guidelines, CCR Section 15381), in that it has some discretionary power over some elements of a future TMP, if such TMP calls for improvements or other activities on roadways within the jurisdiction of the City. In a responsible agency role, the City would follow the process specified in the CEQA Guidelines for consideration and approval of the environmental analysis prepared by the County for a TMP after such documentation is prepared and adopted by the County. (State CEQA Guidelines, CCR Section 15096.) Because no final project description for a TMP has been developed as of the completion of this FEIR/FEIS, the City would have to speculate as to those portions of a TMP that might be proposed for implementation within its jurisdiction, or the impacts that could arise from the implementation of as-yet uncertain components. Accordingly, formulation of the precise means of mitigating the potential cumulative air quality impacts pursuant to the TMP is not currently feasible or practical. However, as the preferred, feasible, and intended mitigation strategy to address the cumulative impacts of quarry truck traffic through the SPA, the City shall implement, or cause to be implemented those portions of the TMP (as described above) that are within its authority to control. In implementing the TMP, the City shall ensure that the TMP or traffic measures imposed by the City within the SPA reduce the risk of cancer to sensitive receptors along routes within the SPA from toxic air contaminant emissions to no more than 296 in one million (SMAQMD 2009. March. Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways, Version 2.2:7), or such different threshold of significance mandated by SMAQMD or ARB at the time, if any. With this mitigation, the cumulative air quality impacts from truck toxic air contaminants would be less than significant. As an alternative (or in addition) to implementing the TMP within the SPA, the following measures could (and should) be voluntarily implemented by the quarry project applicant(s) (Teichert, DeSilva Gates, and Granite [Walltown]) to help ensure exposure of sensitive receptors to TACs generated by quarry truck traffic to the 296-in-one-million threshold of significance identified above. The City encourages implementation of the following measures: ► The quarry project applicant(s) should meet with the City of Folsom to discuss mitigation strategies, implementation, and cost. ► A site-specific, project-level screening analysis and/or Health Risk Assessment (HRA) should be conducted by the City of Folsom and funded by the truck applicant(s) for all proposed sensitive receptors (e.g., residences, schools) in the SPA that would be located along the sides of roadway segments that are identified in Table 4-4 as being potentially significant under any of the analyzed scenarios. Each project-level analysis shall be performed according to the standards set forth by SMAQMD for the purpose of disclosure to the public and decision makers. The project-level analysis shall account for the location of the receptors relative to the roadway, their distance from the roadway, the projected future traffic volume for the year 2030 (including the proportion of diesel trucks), and emission rates representative of the vehicle fleet for the year when the sensitive land uses would first become operational and/or occupied. If the incremental increase in cancer risk determined by in the HRA exceeds 296 in one million (or a different threshold of significance recommended by SMAQMD or ARB at the time, if any), then project design mitigation should be employed, which may include the following:	Prior to approval of first tentative map or discretionary approval within SPA that would place sensitive receptors along roadways that quarry trucks would reasonably use to access U.S. Highway 50.	The project applicant(s) of the Folsom South of U.S. 50 Specific Plan project.	City of Folsom Community Development Department.	

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• Increase the setback distance between the roadway and affected receptor. If this mitigation measure is determined by the City of Folsom to be necessary, based on the results of the HRA, the quarry truck applicant(s) should pay the Folsom South of U.S. 50 Specific Plan project applicant(s) and the City of Folsom a fee that shall serve as compensation for lost development profit and lost City tax revenues, all as determined by the parties. Said mitigation fee shall be determined in consultation with the quarry project applicant(s), the Folsom South of U.S. 50 Specific Plan project applicant(s), and the City of Folsom. No quarry trucks shall be allowed to pass on any roadway segment immediately adjacent to or within the SPA until said mitigation fees are paid. • Implement tiered tree planting of fine-needle species, such as redwood, along the near side of the roadway segments and, if feasible, along the roadway 500 feet in both directions of the initial planting (e.g., 500 feet north and south of a roadway that runs east-west) to enhance the dispersion and filtration of mobile-source TACs associated with the adjacent roadway. These trees should be planted at a density such that a solid visual buffer is achieved after the trees reach maturity, which breaks the line of sight between U.S. 50 and the proposed homes. These trees should be planted before occupation of any affected sensitive land uses. This measure encourages the planting of these trees in advance of the construction of potentially affected receptors to allow the trees to become established and progress toward maturity. The life of these trees should be maintained through the duration of the quarry projects. The planting, cost, and ongoing maintenance of these trees should be funded by the quarry project applicant(s). • To improve the indoor air quality at affected receptors, implement the following measures before the occupancy of the affected residences and schools: • equip all affected residences and school buildings developed in the SPA with High Efficiency Particle Arresting (HEPA) filter systems at all mechanical air intake points to the interior rooms; • use the heating, ventilation, and air conditioning (HVAC) systems to maintain all residential units under positive pressure at all times; • locate air intake systems for HVAC as far away from roadway air pollution sources as possible; and • develop and implement an ongoing education and maintenance plan about the filtration systems associated with HVAC for residences and schools. To the extent this indoor air quality mitigation would not already be implemented as part of the Folsom South of U.S. 50 Specific Plan project development, this mitigation should be paid for by the quarry project applicant(s) before any quarry trucks are allowed to pass on any roadway that is within 400 feet of any residence or school within the SPA.				
CUMULATIVE - NOISE				
Cumulative Mitigation Measure NOISE-I-Land: Implement East Sacramento Regional Aggregate Mining Truck Management Plan or Other Measures to Reduce Exposure of Sensitive Receptors to Operational Noise from Quarry Truck Traffic. The City of Folsom is a participant in the development of an East Sacramento Regional Aggregate Mining Truck Management Plan (TMP), a cooperative effort led by the County of Sacramento, with the input of the City of Folsom, the City of Rancho Cordova and other interested parties, including representatives of quarry project applicants. When the County Board of Supervisors approved entitlements for the Teichert quarry project in November 2010, it also adopted conditions of approval and a development agreement that requires Teichert's participation in, and fair share funding of, a TMP to implement roadway capacity and safety improvements required to improve the compatibility of truck traffic from the quarries with the future urban development in the SPA and other jurisdictions that will be affected by quarry truck traffic. The development agreement adopted by the County for the Teichert project imposes limits on the amounts of annual aggregate sales from Teichert's facility until a TMP is adopted. The City of Folsom does not have direct jurisdiction over the Teichert, DeSilva Gates, or Walltown quarry project applicants as these projects are located within the unincorporated portion of the County. The County, as the agency with the primary authority over the quarries, has indicated that it intends to prepare an environmental analysis in accordance with CEQA prior to adoption of a TMP. The City's authority to control the activities of the quarry trucks includes restrictions or other actions, such as the approval and implementation of specialized road improvements to accommodate quarry truck traffic, that would be applicable within the City's jurisdictional boundaries. For the foregoing reasons, the City of Folsom considers itself a "responsible agency" (as that term is defined at State CEQA Guidelines, CCR Section 15381), in that it has some discretionary power over some elements of a future TMP, if such TMP calls for improvements or other activities on roadways within the jurisdiction of the City. In a responsible agency role, the City would follow the process specified in the CEQA Guidelines for consideration and approval of the environmental analysis prepared by the County for a TMP after such documentation is prepared and adopted by the County. (State CEQA Guidelines, CCR Section 15096.) Because no final project description for a TMP has been developed as of the completion of this FEIR/FEIS, the City would have to speculate	Prior to approval of first tentative map or discretionary approval within SPA that would place sensitive receptors along roadways that quarry trucks would reasonably use to access U.S. 50.	The project applicant(s) of the Folsom South of U.S. 50 Specific Plan project.	City of Folsom Community Development Department.	

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as to those portions of a TMP that might be proposed for implementation within its jurisdiction, or the impacts that could arise from the of as-yet uncertain components. Accordingly, formulation of the precise means of mitigating the potential cumulative noise impacts pursuant to the TMP is not currently feasible or practical. However, as the preferred, feasible, and intended mitigation strategy to address the cumulative impacts of quarry truck traffic through the SPA, the City sball implement, or cause to be implemented those portions of the TMP (as described above) that are within its authority to control. In implementing the TMP, the City shall ensure that the TMP or traffic measures imposed by the City within the SPA reduce the traffic noise exposure to sensitive receptors along routes within the SPA so as to ensure that sensitive receptors are not exposed to interior noise levels in excess of 45 dBA, or increases in interior noise levels of 3 dBA or more, whichever is more restrictive. With this mitigation, the cumulative noise impacts from truck traffic would be less than significant. As an alternative (or in addition) to implementing the TMP within the SPA, the following measures could (and should) be voluntarily implemented by the quarry project applicant(s) (Teichert, DeSilva Gates, and Granite [Walltown]) to help ensure interior noise levels for sensitive receptors to noise generated by quarry truck traffic would not exceed 45 dBA or increase of 3 dBA over existing conditions, as identified above. The City encourages implementation of the following measures: ► The quarry project applicant(s) should meet with the City of Folsom to discuss mitigation strategies, implementation, and cost. ► A site-specific, project-level screening analysis should be conducted by the City of Folsom and funded by the quarry truck applicant(s) for all proposed sensitive receptors (e.g., residences, schools) in the SPA that would be located along the sides of roadway segments that are identified in Table 4-8 as being potentially significant under any of the analyzed scenarios. The analysis should be conducted using an approved three dimensional traffic noise modeling program (i.e., TNM or SoundPlan). Each project-level analysis should be performed according to the standards set forth by the City of Folsom for the purpose of disclosure to the public and decision makers. The project-level analysis should account for the location of the receptors relative to the roadway, their distance from the roadway, and the projected future traffic volume for the year 2030 (including the percentage of heavy trucks). If the incremental increase in traffic noise levels are determined to exceed the threshold of significance recommended by the City of Folsom, then design mitigation should be employed, which may include the following: ► Model the benefits of soundwalls (berm/wall combination) along the quarry truck hauling roadways and affected receptors not to exceed a total height of eight feet (two-foot berm and six-foot concrete mason wall). If this mitigation measure is determined by the City of Folsom to be inadequate, additional three dimensional traffic noise modeling should be conducted with the inclusion of rubberized asphalt at the expense of the quarry truck applicant(s). No quarry trucks should be allowed to pass on any roadway segment immediately adjacent to or within the SPA until said mitigation has been agreed upon by the City of Folsom and fees for construction of said mitigation are paid by the quarry truck applicant(s). ► Implement the installation of rubberized asphalt (quiet pavement) on roadway segments adjacent to sensitive receptors that carry quarry trucks if soundwalls do not provide adequate reduction of traffic noise levels. The inclusion of rubberized asphalt would provide an additional 3 to 5 dB of traffic noise reduction. The cost of construction using rubberized asphalt should be borne by the quarry truck applicant(s). Said mitigation fee should be determined in consultation with the quarry project applicant(s), the Folsom South of U.W. 50 Specific Plan project applicant(s), and the City of Folsom. No quarry trucks sbould be allowed to pass on any roadway segment immediately adjacent to or within the SPA until said mitigation fees are paid. ► To improve the indoor noise levels at affected receptors, implement the following measures before the occupancy of the affected residences and schools: • Conduct an interior noise analysis once detailed construction plans of residences adjacent to affected roadways are available to determine the required window package at second and third floor receptors to achieve the interior noise level standard of 45 dB Ldn without quarry trucks. • Determine the interior quarry truck traffic noise level increases at second and third floor receptors adjacent to affected roadways compared to no quarry truck conditions. Window package upgrades are expected to be necessary due to the traffic noise level increases caused by quarry trucks along affected roadways. Quarry truck applicant(s) should pay for the cost of window package upgrades (increased sound transmission class rated windows) required to achieve the interior noise level standard of 45 dB Ldn with the inclusion of quarry truck traffic. To the extent this noise mitigation would not already be implemented as part of the Folsom South of U.W. 50 Specific Plan project development, this mitigation should be paid for by the quarry project applicant(s) before any quarry trucks are allowed to pass on any roadway that is within 400 feet of any residence or school within the SPA.				

APPENDIX B

Alder Creek Property Project Emissions Report

ECORP Consulting, Inc. July 2025.

Alder Creek Property Project Detailed Report

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Data Field	Value
Project Name	Alder Creek Property Project
Construction Start Date	3/3/2026
Operational Year	2028
Lead Agency	—
Land Use Scale	Plan/community
Analysis Level for Defaults	County
Windspeed (m/s)	2.70
Precipitation (days)	9.40
Location	38.63087462620575, -121.14203082090893
County	Sacramento
City	Folsom
Air District	Sacramento Metropolitan AQMD
Air Basin	Sacramento Valley
TAZ	779
EDFZ	13
Electric Utility	Sacramento Municipal Utility District
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.29

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Single Family Housing	1,424	Dwelling Unit	277	2,776,800	16,679,108	—	3,987	—

City Park	13.8	Acre	13.8	0.00	0.00	0.00	—	—
Other Asphalt Surfaces	19.7	Acre	19.7	0.00	435,600	—	—	—
Government Office Building	24.8	1000sqft	1.90	24,829	0.00	—	—	—
City Park	137	Acre	137	0.00	0.00	0.00	—	Open Space

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

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2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	32.1	29.2	63.0	0.07	1.24	19.8	21.1	1.14	10.1	11.3	—	15,590	15,590	0.56	0.94	36.1	15,922
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	31.8	29.2	53.5	0.07	1.24	19.8	21.1	1.14	10.1	11.3	—	14,792	14,792	0.60	0.96	0.94	15,093
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	22.5	19.0	37.4	0.05	0.60	6.27	6.88	0.56	2.45	3.01	—	10,531	10,531	0.39	0.65	10.1	10,744
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	4.10	3.46	6.82	0.01	0.11	1.15	1.26	0.10	0.45	0.55	—	1,744	1,744	0.06	0.11	1.67	1,779

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	32.1	29.2	63.0	0.07	1.24	19.8	21.1	1.14	10.1	11.3	—	15,590	15,590	0.56	0.94	36.1	15,922
2027	31.9	26.0	60.8	0.07	0.71	7.65	8.36	0.66	1.83	2.50	—	15,363	15,363	0.53	0.91	32.7	15,680
2028	31.5	24.5	58.5	0.07	0.63	7.65	8.28	0.59	1.83	2.42	—	15,104	15,104	0.51	0.71	29.4	15,357
2029	31.3	23.5	56.6	0.07	0.59	7.65	8.24	0.55	1.83	2.38	—	14,854	14,854	0.51	0.68	26.2	15,096
2030	31.2	22.5	54.8	0.07	0.55	7.65	8.20	0.48	1.83	2.32	—	14,603	14,603	0.48	0.68	23.2	14,840
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	31.8	29.2	53.5	0.07	1.24	19.8	21.1	1.14	10.1	11.3	—	14,792	14,792	0.60	0.96	0.94	15,093
2027	31.4	27.0	51.8	0.07	0.72	7.65	8.37	0.67	1.83	2.50	—	14,580	14,580	0.57	0.92	0.85	14,871
2028	31.3	25.4	50.2	0.07	0.63	7.65	8.28	0.59	1.83	2.42	—	14,339	14,339	0.55	0.92	0.76	14,629
2029	31.1	24.2	48.7	0.07	0.59	7.65	8.24	0.55	1.83	2.38	—	14,105	14,105	0.55	0.89	0.68	14,386
2030	31.0	23.4	47.4	0.07	0.55	7.65	8.20	0.48	1.83	2.32	—	13,867	13,867	0.51	0.88	0.60	14,143
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	8.32	16.5	22.8	0.04	0.60	6.27	6.88	0.56	2.45	3.01	—	5,744	5,744	0.23	0.24	3.63	5,824
2027	22.5	19.0	37.4	0.05	0.51	5.43	5.94	0.47	1.30	1.77	—	10,531	10,531	0.39	0.65	10.1	10,744
2028	22.4	18.0	36.3	0.05	0.45	5.45	5.90	0.42	1.31	1.73	—	10,384	10,384	0.39	0.65	9.10	10,597
2029	22.2	17.0	35.2	0.05	0.42	5.43	5.85	0.39	1.30	1.69	—	10,186	10,186	0.37	0.63	8.05	10,391
2030	8.74	6.48	13.5	0.02	0.16	2.14	2.30	0.14	0.51	0.65	—	3,951	3,951	0.14	0.19	2.82	4,014
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	1.52	3.02	4.16	0.01	0.11	1.15	1.26	0.10	0.45	0.55	—	951	951	0.04	0.04	0.60	964
2027	4.10	3.46	6.82	0.01	0.09	0.99	1.08	0.09	0.24	0.32	—	1,744	1,744	0.06	0.11	1.67	1,779
2028	4.09	3.28	6.62	0.01	0.08	0.99	1.08	0.08	0.24	0.31	—	1,719	1,719	0.06	0.11	1.51	1,754

2029	4.06	3.11	6.41	0.01	0.08	0.99	1.07	0.07	0.24	0.31	—	1,686	1,686	0.06	0.10	1.33	1,720
2030	1.59	1.18	2.46	< 0.005	0.03	0.39	0.42	0.02	0.09	0.12	—	654	654	0.02	0.03	0.47	665

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	135	69.6	668	1.44	2.12	119	121	2.05	30.2	32.2	636	170,575	171,211	59.6	5.72	417	174,822
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	122	78.4	487	1.32	2.08	119	121	2.02	30.2	32.2	636	158,402	159,038	60.1	6.23	30.2	162,428
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	126	73.6	530	1.32	2.09	115	118	2.02	29.3	31.4	636	158,275	158,910	59.7	5.86	188	162,338
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	22.9	13.4	96.8	0.24	0.38	21.1	21.5	0.37	5.35	5.72	105	26,204	26,309	9.88	0.97	31.1	26,877

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	59.4	54.5	579	1.35	0.92	119	120	0.86	30.2	31.0	—	137,891	137,891	5.29	5.36	397	140,019
Area	74.5	0.77	82.0	< 0.005	0.04	—	0.04	0.03	—	0.03	—	220	220	0.01	< 0.005	—	221
Energy	0.84	14.4	6.20	0.09	1.16	—	1.16	1.16	—	1.16	—	31,829	31,829	2.08	0.10	—	31,909

Water	—	—	—	—	—	—	—	—	—	—	118	635	753	0.43	0.26	—	841
Waste	—	—	—	—	—	—	—	—	—	—	518	0.00	518	51.8	0.00	—	1,812
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19.9	19.9
Total	135	69.6	668	1.44	2.12	119	121	2.05	30.2	32.2	636	170,575	171,211	59.6	5.72	417	174,822
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	53.7	64.0	480	1.23	0.92	119	120	0.86	30.2	31.0	—	125,939	125,939	5.87	5.87	10.3	127,846
Area	67.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.84	14.4	6.20	0.09	1.16	—	1.16	1.16	—	1.16	—	31,829	31,829	2.08	0.10	—	31,909
Water	—	—	—	—	—	—	—	—	—	—	118	635	753	0.43	0.26	—	841
Waste	—	—	—	—	—	—	—	—	—	—	518	0.00	518	51.8	0.00	—	1,812
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19.9	19.9
Total	122	78.4	487	1.32	2.08	119	121	2.02	30.2	32.2	636	158,402	159,038	60.1	6.23	30.2	162,428
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	52.6	58.7	468	1.23	0.90	115	116	0.84	29.3	30.2	—	125,660	125,660	5.42	5.51	168	127,605
Area	72.2	0.53	56.2	< 0.005	0.03	—	0.03	0.02	—	0.02	—	151	151	0.01	< 0.005	—	152
Energy	0.84	14.4	6.20	0.09	1.16	—	1.16	1.16	—	1.16	—	31,829	31,829	2.08	0.10	—	31,909
Water	—	—	—	—	—	—	—	—	—	—	118	635	753	0.43	0.26	—	841
Waste	—	—	—	—	—	—	—	—	—	—	518	0.00	518	51.8	0.00	—	1,812
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19.9	19.9
Total	126	73.6	530	1.32	2.09	115	118	2.02	29.3	31.4	636	158,275	158,910	59.7	5.86	188	162,338
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	9.60	10.7	85.4	0.22	0.16	21.1	21.2	0.15	5.35	5.51	—	20,805	20,805	0.90	0.91	27.8	21,126
Area	13.2	0.10	10.3	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	25.0	25.0	< 0.005	< 0.005	—	25.1
Energy	0.15	2.62	1.13	0.02	0.21	—	0.21	0.21	—	0.21	—	5,270	5,270	0.34	0.02	—	5,283
Water	—	—	—	—	—	—	—	—	—	—	19.5	105	125	0.07	0.04	—	139
Waste	—	—	—	—	—	—	—	—	—	—	85.7	0.00	85.7	8.57	0.00	—	300

Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.30	3.30
Total	22.9	13.4	96.8	0.24	0.38	21.1	21.5	0.37	5.35	5.72	105	26,204	26,309	9.88	0.97	31.1	26,877

3. Construction Emissions Details

3.1. Site Preparation (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.14	29.2	28.8	0.05	1.24	—	1.24	1.14	—	1.14	—	5,298	5,298	0.21	0.04	—	5,316
Dust From Material Movement	—	—	—	—	—	19.7	19.7	—	10.1	10.1	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.14	29.2	28.8	0.05	1.24	—	1.24	1.14	—	1.14	—	5,298	5,298	0.21	0.04	—	5,316
Dust From Material Movement	—	—	—	—	—	19.7	19.7	—	10.1	10.1	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.33	3.04	3.00	0.01	0.13	—	0.13	0.12	—	0.12	—	552	552	0.02	< 0.005	—	553
Dust From Material Movement	—	—	—	—	—	2.05	2.05	—	1.05	1.05	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.55	0.55	< 0.005	0.02	—	0.02	0.02	—	0.02	—	91.3	91.3	< 0.005	< 0.005	—	91.6
Dust From Material Movement	—	—	—	—	—	0.37	0.37	—	0.19	0.19	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.05	0.99	0.00	0.00	0.18	0.18	0.00	0.04	0.04	—	195	195	< 0.005	0.01	0.70	198
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.73	0.00	0.00	0.18	0.18	0.00	0.04	0.04	—	173	173	< 0.005	0.01	0.02	175
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	18.5	18.5	< 0.005	< 0.005	0.03	18.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.06	3.06	< 0.005	< 0.005	0.01	3.10
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Grading (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.04	27.2	27.6	0.06	1.12	—	1.12	1.03	—	1.03	—	6,599	6,599	0.27	0.05	—	6,621
Dust From Material Movement	—	—	—	—	—	9.20	9.20	—	3.65	3.65	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.81	7.24	7.33	0.02	0.30	—	0.30	0.27	—	0.27	—	1,754	1,754	0.07	0.01	—	1,760
Dust From Material Movement	—	—	—	—	—	2.45	2.45	—	0.97	0.97	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	1.32	1.34	< 0.005	0.05	—	0.05	0.05	—	0.05	—	290	290	0.01	< 0.005	—	291
Dust From Material Movement	—	—	—	—	—	0.45	0.45	—	0.18	0.18	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.05	1.13	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	223	223	< 0.005	0.01	0.80	226
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.22	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	53.9	53.9	< 0.005	< 0.005	0.09	54.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.93	8.93	< 0.005	< 0.005	0.02	9.05
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Building Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.24	2.22	2.92	0.01	0.09	—	0.09	0.08	—	0.08	—	539	539	0.02	< 0.005	—	541
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.40	0.53	< 0.005	0.02	—	0.02	0.01	—	0.01	—	89.3	89.3	< 0.005	< 0.005	—	89.6
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	2.08	1.34	29.3	0.00	0.00	5.26	5.26	0.00	1.23	1.23	—	5,794	5,794	0.08	0.20	20.7	5,876
Vendor	0.16	7.66	2.92	0.03	0.06	1.18	1.24	0.06	0.32	0.38	—	4,430	4,430	0.29	0.67	10.7	4,647
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.89	1.74	21.6	0.00	0.00	5.26	5.26	0.00	1.23	1.23	—	5,145	5,145	0.11	0.21	0.54	5,211
Vendor	0.16	8.21	2.98	0.03	0.06	1.18	1.25	0.06	0.32	0.38	—	4,428	4,428	0.29	0.66	0.28	4,634
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.42	0.34	4.95	0.00	0.00	1.18	1.18	0.00	0.28	0.28	—	1,188	1,188	0.02	0.05	2.01	1,205
Vendor	0.04	1.82	0.67	0.01	0.01	0.27	0.28	0.01	0.07	0.09	—	997	997	0.07	0.15	1.03	1,044
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.06	0.90	0.00	0.00	0.21	0.21	0.00	0.05	0.05	—	197	197	< 0.005	0.01	0.33	199
Vendor	0.01	0.33	0.12	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	—	165	165	0.01	0.02	0.17	173
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Building Construction (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	2,405

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.74	6.71	9.24	0.02	0.24	—	0.24	0.22	—	0.22	—	1,712	1,712	0.07	0.01	—	1,718
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	1.22	1.69	< 0.005	0.04	—	0.04	0.04	—	0.04	—	283	283	0.01	< 0.005	—	284
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	2.02	1.32	27.6	0.00	0.00	5.26	5.26	0.00	1.23	1.23	—	5,690	5,690	0.08	0.20	18.8	5,770
Vendor	0.16	7.20	2.83	0.03	0.06	1.18	1.24	0.06	0.32	0.38	—	4,329	4,329	0.26	0.63	9.58	4,534
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.64	1.71	20.2	0.00	0.00	5.26	5.26	0.00	1.23	1.23	—	5,054	5,054	0.11	0.21	0.49	5,120
Vendor	0.15	7.69	2.88	0.03	0.06	1.18	1.25	0.06	0.32	0.38	—	4,328	4,328	0.26	0.63	0.25	4,524
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.17	1.07	14.8	0.00	0.00	3.73	3.73	0.00	0.87	0.87	—	3,705	3,705	0.07	0.14	5.80	3,754
Vendor	0.11	5.39	2.02	0.02	0.04	0.84	0.88	0.04	0.23	0.27	—	3,092	3,092	0.19	0.45	2.95	3,234
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.21	0.20	2.70	0.00	0.00	0.68	0.68	0.00	0.16	0.16	—	613	613	0.01	0.02	0.96	622
Vendor	0.02	0.98	0.37	< 0.005	0.01	0.15	0.16	0.01	0.04	0.05	—	512	512	0.03	0.07	0.49	535
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Building Construction (2028) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.71	6.39	9.26	0.02	0.22	—	0.22	0.20	—	0.20	—	1,717	1,717	0.07	0.01	—	1,723
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	1.17	1.69	< 0.005	0.04	—	0.04	0.04	—	0.04	—	284	284	0.01	< 0.005	—	285
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.78	1.14	25.9	0.00	0.00	5.26	5.26	0.00	1.23	1.23	—	5,573	5,573	0.07	0.03	17.0	5,602
Vendor	0.16	6.72	2.70	0.03	0.06	1.18	1.24	0.06	0.32	0.38	—	4,214	4,214	0.26	0.63	8.50	4,418
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.60	1.53	19.1	0.00	0.00	5.26	5.26	0.00	1.23	1.23	—	4,951	4,951	0.10	0.21	0.44	5,016
Vendor	0.15	7.19	2.78	0.03	0.06	1.18	1.24	0.06	0.32	0.38	—	4,213	4,213	0.26	0.63	0.22	4,409
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.15	0.95	14.0	0.00	0.00	3.74	3.74	0.00	0.88	0.88	—	3,639	3,639	0.07	0.14	5.26	3,688
Vendor	0.11	5.07	1.96	0.02	0.04	0.84	0.89	0.04	0.23	0.27	—	3,018	3,018	0.19	0.45	2.63	3,160
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.21	0.17	2.55	0.00	0.00	0.68	0.68	0.00	0.16	0.16	—	602	602	0.01	0.02	0.87	611
Vendor	0.02	0.92	0.36	< 0.005	0.01	0.15	0.16	0.01	0.04	0.05	—	500	500	0.03	0.08	0.44	523
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Building Construction (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.97	8.58	12.9	0.02	0.28	—	0.28	0.25	—	0.25	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.97	8.58	12.9	0.02	0.28	—	0.28	0.25	—	0.25	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.69	6.13	9.22	0.02	0.20	—	0.20	0.18	—	0.18	—	1,712	1,712	0.07	0.01	—	1,718
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	1.12	1.68	< 0.005	0.04	—	0.04	0.03	—	0.03	—	283	283	0.01	< 0.005	—	284
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.70	1.12	24.4	0.00	0.00	5.26	5.26	0.00	1.23	1.23	—	5,473	5,473	0.07	0.03	15.3	5,500
Vendor	0.13	6.28	2.61	0.03	0.06	1.18	1.24	0.06	0.32	0.38	—	4,088	4,088	0.26	0.60	7.41	4,282
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.52	1.35	18.0	0.00	0.00	5.26	5.26	0.00	1.23	1.23	—	4,863	4,863	0.10	0.21	0.39	4,928
Vendor	0.12	6.72	2.68	0.03	0.06	1.18	1.24	0.06	0.32	0.38	—	4,088	4,088	0.26	0.60	0.19	4,275

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.09	0.82	13.2	0.00	0.00	3.73	3.73	0.00	0.87	0.87	—	3,564	3,564	0.06	0.14	4.69	3,613
Vendor	0.09	4.72	1.88	0.02	0.04	0.84	0.88	0.04	0.23	0.27	—	2,920	2,920	0.19	0.43	2.29	3,056
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.20	0.15	2.40	0.00	0.00	0.68	0.68	0.00	0.16	0.16	—	590	590	0.01	0.02	0.78	598
Vendor	0.02	0.86	0.34	< 0.005	0.01	0.15	0.16	0.01	0.04	0.05	—	483	483	0.03	0.07	0.38	506
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Building Construction (2030) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.94	8.39	12.9	0.02	0.26	—	0.26	0.24	—	0.24	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.94	8.39	12.9	0.02	0.26	—	0.26	0.24	—	0.24	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.26	2.36	3.63	0.01	0.07	—	0.07	0.07	—	0.07	—	675	675	0.03	0.01	—	678
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.43	0.66	< 0.005	0.01	—	0.01	0.01	—	0.01	—	112	112	< 0.005	< 0.005	—	112
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.63	0.94	23.1	0.00	0.00	5.26	5.26	0.00	1.23	1.23	—	5,379	5,379	0.07	0.03	13.6	5,404
Vendor	0.13	5.87	2.52	0.03	0.06	1.18	1.24	0.03	0.32	0.35	—	3,953	3,953	0.23	0.60	6.46	4,145
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.46	1.33	17.0	0.00	0.00	5.26	5.26	0.00	1.23	1.23	—	4,780	4,780	0.09	0.20	0.35	4,841
Vendor	0.12	6.29	2.59	0.03	0.06	1.18	1.24	0.03	0.32	0.35	—	3,953	3,953	0.23	0.60	0.17	4,139
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.41	0.32	4.90	0.00	0.00	1.47	1.47	0.00	0.35	0.35	—	1,382	1,382	0.02	0.01	1.65	1,387
Vendor	0.04	1.74	0.72	0.01	0.02	0.33	0.35	0.01	0.09	0.10	—	1,114	1,114	0.06	0.17	0.79	1,167
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.06	0.89	0.00	0.00	0.27	0.27	0.00	0.06	0.06	—	229	229	< 0.005	< 0.005	0.27	230
Vendor	0.01	0.32	0.13	< 0.005	< 0.005	0.06	0.06	< 0.005	0.02	0.02	—	184	184	0.01	0.03	0.13	193
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.15. Paving (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.76	7.12	9.94	0.01	0.32	—	0.32	0.29	—	0.29	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.76	7.12	9.94	0.01	0.32	—	0.32	0.29	—	0.29	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.17	1.60	2.24	< 0.005	0.07	—	0.07	0.07	—	0.07	—	340	340	0.01	< 0.005	—	341
Paving	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.29	0.41	< 0.005	0.01	—	0.01	0.01	—	0.01	—	56.3	56.3	< 0.005	< 0.005	—	56.5
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.04	0.85	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	167	167	< 0.005	0.01	0.60	169
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.62	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	148	148	< 0.005	0.01	0.02	150
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.14	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	34.2	34.2	< 0.005	< 0.005	0.06	34.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.67	5.67	< 0.005	< 0.005	0.01	5.75
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.17. Paving (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.74	6.94	9.95	0.01	0.30	—	0.30	0.27	—	0.27	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.74	6.94	9.95	0.01	0.30	—	0.30	0.27	—	0.27	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.53	4.96	7.11	0.01	0.21	—	0.21	0.20	—	0.20	—	1,079	1,079	0.04	0.01	—	1,083
Paving	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.91	1.30	< 0.005	0.04	—	0.04	0.04	—	0.04	—	179	179	0.01	< 0.005	—	179
Paving	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.04	0.80	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	164	164	< 0.005	0.01	0.54	166
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.58	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	146	146	< 0.005	0.01	0.01	148
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.43	0.00	0.00	0.11	0.11	0.00	0.03	0.03	—	107	107	< 0.005	< 0.005	0.17	108
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	17.7	17.7	< 0.005	< 0.005	0.03	17.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.19. Paving (2028) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.69	6.63	9.91	0.01	0.26	—	0.26	0.24	—	0.24	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.69	6.63	9.91	0.01	0.26	—	0.26	0.24	—	0.24	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.49	4.75	7.10	0.01	0.18	—	0.18	0.17	—	0.17	—	1,082	1,082	0.04	0.01	—	1,086
Paving	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.87	1.30	< 0.005	0.03	—	0.03	0.03	—	0.03	—	179	179	0.01	< 0.005	—	180
Paving	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.03	0.75	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	161	161	< 0.005	< 0.005	0.49	161
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.55	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	143	143	< 0.005	0.01	0.01	145
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.03	0.03	0.40	0.00	0.00	0.11	0.11	0.00	0.03	0.03	—	105	105	< 0.005	< 0.005	0.15	106
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.07	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	17.4	17.4	< 0.005	< 0.005	0.03	17.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.21. Paving (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.67	6.46	9.92	0.01	0.24	—	0.24	0.22	—	0.22	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.67	6.46	9.92	0.01	0.24	—	0.24	0.22	—	0.22	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.48	4.61	7.08	0.01	0.17	—	0.17	0.16	—	0.16	—	1,079	1,079	0.04	0.01	—	1,083

Paving	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.84	1.29	< 0.005	0.03	—	0.03	0.03	—	0.03	—	179	179	0.01	< 0.005	—	179
Paving	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.03	0.70	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	158	158	< 0.005	< 0.005	0.44	158
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.52	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	140	140	< 0.005	0.01	0.01	142
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.38	0.00	0.00	0.11	0.11	0.00	0.03	0.03	—	103	103	< 0.005	< 0.005	0.14	104
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.07	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	17.0	17.0	< 0.005	< 0.005	0.02	17.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.23. Paving (2030) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.64	6.28	9.90	0.01	0.22	—	0.22	0.20	—	0.20	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.64	6.28	9.90	0.01	0.22	—	0.22	0.20	—	0.20	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.18	1.77	2.79	< 0.005	0.06	—	0.06	0.06	—	0.06	—	426	426	0.02	< 0.005	—	427
Paving	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.32	0.51	< 0.005	0.01	—	0.01	0.01	—	0.01	—	70.5	70.5	< 0.005	< 0.005	—	70.7
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.03	0.67	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	155	155	< 0.005	< 0.005	0.39	156
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.49	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	138	138	< 0.005	0.01	0.01	140
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.14	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	39.8	39.8	< 0.005	< 0.005	0.05	40.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.59	6.59	< 0.005	< 0.005	0.01	6.62
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.25. Architectural Coating (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.12	0.86	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	27.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.86	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	27.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.19	0.25	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	30.0	30.0	< 0.005	< 0.005	—	30.1
Architectural Coatings	6.15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.04	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.97	4.97	< 0.005	< 0.005	—	4.99
Architectural Coatings	1.12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.42	0.27	5.87	0.00	0.00	1.05	1.05	0.00	0.25	0.25	—	1,159	1,159	0.02	0.04	4.14	1,175
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.38	0.35	4.31	0.00	0.00	1.05	1.05	0.00	0.25	0.25	—	1,029	1,029	0.02	0.04	0.11	1,042
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.99	0.00	0.00	0.24	0.24	0.00	0.06	0.06	—	238	238	< 0.005	0.01	0.40	241
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.18	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	39.3	39.3	< 0.005	< 0.005	0.07	39.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.27. Architectural Coating (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.83	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134

Architect Coatings	27.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.83	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	27.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.59	0.80	< 0.005	0.01	—	0.01	0.01	—	0.01	—	95.4	95.4	< 0.005	< 0.005	—	95.7
Architectural Coatings	19.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.11	0.15	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.8
Architectural Coatings	3.56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.40	0.26	5.52	0.00	0.00	1.05	1.05	0.00	0.25	0.25	—	1,138	1,138	0.02	0.04	3.76	1,154
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.33	0.34	4.05	0.00	0.00	1.05	1.05	0.00	0.25	0.25	—	1,011	1,011	0.02	0.04	0.10	1,024
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.23	0.21	2.96	0.00	0.00	0.75	0.75	0.00	0.17	0.17	—	741	741	0.01	0.03	1.16	751
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.54	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	123	123	< 0.005	< 0.005	0.19	124
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.29. Architectural Coating (2028) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	27.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	27.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.58	0.80	< 0.005	0.01	—	0.01	0.01	—	0.01	—	95.6	95.6	< 0.005	< 0.005	—	96.0
Architectural Coatings	19.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.11	0.15	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.9
Architectural Coatings	3.57	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.36	0.23	5.19	0.00	0.00	1.05	1.05	0.00	0.25	0.25	—	1,115	1,115	0.01	0.01	3.40	1,120
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.32	0.31	3.82	0.00	0.00	1.05	1.05	0.00	0.25	0.25	—	990	990	0.02	0.04	0.09	1,003
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.23	0.19	2.79	0.00	0.00	0.75	0.75	0.00	0.18	0.18	—	728	728	0.01	0.03	1.05	738
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.51	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	120	120	< 0.005	< 0.005	0.17	122
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.31. Architectural Coating (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.79	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	27.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.79	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	27.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.57	0.79	< 0.005	0.01	—	0.01	0.01	—	0.01	—	95.4	95.4	< 0.005	< 0.005	—	95.7
Architectural Coatings	19.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.10	0.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.8	15.8	< 0.005	< 0.005	—	15.8
Architectural Coatings	3.56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.34	0.22	4.89	0.00	0.00	1.05	1.05	0.00	0.25	0.25	—	1,095	1,095	0.01	0.01	3.05	1,100
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.30	0.27	3.59	0.00	0.00	1.05	1.05	0.00	0.25	0.25	—	973	973	0.02	0.04	0.08	986
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.22	0.16	2.63	0.00	0.00	0.75	0.75	0.00	0.17	0.17	—	713	713	0.01	0.03	0.94	723
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.48	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	118	118	< 0.005	< 0.005	0.16	120
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.33. Architectural Coating (2030) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.78	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	27.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.78	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	27.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.22	0.31	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	37.6	37.6	< 0.005	< 0.005	—	37.8
Architectural Coatings	7.70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.04	0.06	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.23	6.23	< 0.005	< 0.005	—	6.25
Architectural Coatings	1.41	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.33	0.19	4.62	0.00	0.00	1.05	1.05	0.00	0.25	0.25	—	1,076	1,076	0.01	0.01	2.72	1,081
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.29	0.27	3.40	0.00	0.00	1.05	1.05	0.00	0.25	0.25	—	956	956	0.02	0.04	0.07	968
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.06	0.98	0.00	0.00	0.29	0.29	0.00	0.07	0.07	—	276	276	< 0.005	< 0.005	0.33	277
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.18	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	45.8	45.8	< 0.005	< 0.005	0.05	45.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	57.1	52.4	557	1.30	0.88	114	115	0.83	29.0	29.8	—	132,661	132,661	5.08	5.16	382	134,707
City Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Government Office Building	2.33	2.08	22.1	0.05	0.03	4.50	4.53	0.03	1.14	1.18	—	5,230	5,230	0.20	0.20	15.1	5,312
Total	59.4	54.5	579	1.35	0.92	119	120	0.86	30.2	31.0	—	137,891	137,891	5.29	5.36	397	140,019
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	51.6	61.6	462	1.18	0.88	114	115	0.83	29.0	29.8	—	121,161	121,161	5.64	5.65	9.91	122,996
City Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Government Office Building	2.10	2.45	18.4	0.05	0.03	4.50	4.54	0.03	1.14	1.18	—	4,778	4,778	0.23	0.22	0.39	4,851
Total	53.7	64.0	480	1.23	0.92	119	120	0.86	30.2	31.0	—	125,939	125,939	5.87	5.87	10.3	127,846
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	9.22	10.3	82.0	0.22	0.16	20.3	20.4	0.15	5.15	5.29	—	19,998	19,998	0.86	0.88	26.7	20,307
City Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Government Office Building	0.38	0.42	3.34	0.01	0.01	0.82	0.82	0.01	0.21	0.21	—	807	807	0.04	0.04	1.08	819
Total	9.60	10.7	85.4	0.22	0.16	21.1	21.2	0.15	5.35	5.51	—	20,805	20,805	0.90	0.91	27.8	21,126

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	13,027	13,027	0.45	0.06	—	13,056
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Government Office Building	—	—	—	—	—	—	—	—	—	—	—	587	587	0.02	< 0.005	—	588
Total	—	—	—	—	—	—	—	—	—	—	—	13,614	13,614	0.47	0.06	—	13,644
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	13,027	13,027	0.45	0.06	—	13,056
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Government Office Building	—	—	—	—	—	—	—	—	—	—	—	587	587	0.02	< 0.005	—	588

Total	—	—	—	—	—	—	—	—	—	—	—	13,614	13,614	0.47	0.06	—	13,644
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	2,157	2,157	0.07	0.01	—	2,162
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Government Office Building	—	—	—	—	—	—	—	—	—	—	—	97.2	97.2	< 0.005	< 0.005	—	97.4
Total	—	—	—	—	—	—	—	—	—	—	—	2,254	2,254	0.08	0.01	—	2,259

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.83	14.1	6.02	0.09	1.14	—	1.14	1.14	—	1.14	—	17,950	17,950	1.59	0.03	—	17,999
City Park	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Government Office Building	0.01	0.22	0.19	< 0.005	0.02	—	0.02	0.02	—	0.02	—	265	265	0.02	< 0.005	—	265
Total	0.84	14.4	6.20	0.09	1.16	—	1.16	1.16	—	1.16	—	18,214	18,214	1.61	0.03	—	18,265

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.83	14.1	6.02	0.09	1.14	—	1.14	1.14	—	1.14	—	17,950	17,950	1.59	0.03	—	17,999
City Park	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Government Office Building	0.01	0.22	0.19	< 0.005	0.02	—	0.02	0.02	—	0.02	—	265	265	0.02	< 0.005	—	265
Total	0.84	14.4	6.20	0.09	1.16	—	1.16	1.16	—	1.16	—	18,214	18,214	1.61	0.03	—	18,265
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.15	2.58	1.10	0.02	0.21	—	0.21	0.21	—	0.21	—	2,972	2,972	0.26	0.01	—	2,980
City Park	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Government Office Building	< 0.005	0.04	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	43.8	43.8	< 0.005	< 0.005	—	44.0
Total	0.15	2.62	1.13	0.02	0.21	—	0.21	0.21	—	0.21	—	3,016	3,016	0.27	0.01	—	3,024

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	60.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	7.26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	7.22	0.77	82.0	< 0.005	0.04	—	0.04	0.03	—	0.03	—	220	220	0.01	< 0.005	—	221
Total	74.5	0.77	82.0	< 0.005	0.04	—	0.04	0.03	—	0.03	—	220	220	0.01	< 0.005	—	221
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	60.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	7.26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	67.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	11.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.90	0.10	10.3	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	25.0	25.0	< 0.005	< 0.005	—	25.1
Total	13.2	0.10	10.3	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	25.0	25.0	< 0.005	< 0.005	—	25.1

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	107	611	718	0.39	0.24	—	799
City Park	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	10.1	10.1	< 0.005	< 0.005	—	10.1
Government Office Building	—	—	—	—	—	—	—	—	—	—	10.5	13.7	24.2	0.04	0.02	—	32.0
Total	—	—	—	—	—	—	—	—	—	—	118	635	753	0.43	0.26	—	841
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	107	611	718	0.39	0.24	—	799
City Park	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	10.1	10.1	< 0.005	< 0.005	—	10.1
Government Office Building	—	—	—	—	—	—	—	—	—	—	10.5	13.7	24.2	0.04	0.02	—	32.0

Total	—	—	—	—	—	—	—	—	—	—	118	635	753	0.43	0.26	—	841
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	17.8	101	119	0.06	0.04	—	132
City Park	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	1.67	1.67	< 0.005	< 0.005	—	1.67
Government Office Building	—	—	—	—	—	—	—	—	—	—	1.75	2.27	4.01	0.01	< 0.005	—	5.30
Total	—	—	—	—	—	—	—	—	—	—	19.5	105	125	0.07	0.04	—	139

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	505	0.00	505	50.5	0.00	—	1,768
City Park	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Government Office Building	—	—	—	—	—	—	—	—	—	—	12.4	0.00	12.4	1.24	0.00	—	43.5

Total	—	—	—	—	—	—	—	—	—	—	518	0.00	518	51.8	0.00	—	1,812
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	505	0.00	505	50.5	0.00	—	1,768
City Park	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Government Office Building	—	—	—	—	—	—	—	—	—	—	12.4	0.00	12.4	1.24	0.00	—	43.5
Total	—	—	—	—	—	—	—	—	—	—	518	0.00	518	51.8	0.00	—	1,812
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	83.7	0.00	83.7	8.36	0.00	—	293
City Park	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Government Office Building	—	—	—	—	—	—	—	—	—	—	2.06	0.00	2.06	0.21	0.00	—	7.21
Total	—	—	—	—	—	—	—	—	—	—	85.7	0.00	85.7	8.57	0.00	—	300

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19.9	19.9
City Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00
Government Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.06	0.06
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19.9	19.9
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19.9	19.9
City Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00
Government Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.06	0.06
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19.9	19.9
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.29	3.29
City Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00
Government Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.30	3.30

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Preparation	Site Preparation	3/3/2026	4/23/2026	5.00	38.0	—
Grading	Grading	4/24/2026	9/7/2026	5.00	97.0	—
Building Construction	Building Construction	9/8/2026	5/24/2030	5.00	969	—
Paving	Paving	9/8/2026	5/24/2030	5.00	969	—
Architectural Coating	Architectural Coating	9/8/2026	5/24/2030	5.00	969	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Grading	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Grading	Scrapers	Diesel	Average	2.00	8.00	423	0.48
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Paving	Pavers	Diesel	Average	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	8.00	89.0	0.36

Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	14.3	LDA,LDT1,LDT2
Site Preparation	Vendor	—	8.80	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	14.3	LDA,LDT1,LDT2
Grading	Vendor	—	8.80	HHDT,MHDT
Grading	Hauling	0.00	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	521	14.3	LDA,LDT1,LDT2
Building Construction	Vendor	156	8.80	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	14.3	LDA,LDT1,LDT2
Paving	Vendor	—	8.80	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—

Architectural Coating	Worker	104	14.3	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	8.80	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	5,623,020	1,874,340	37,244	12,415	51,488

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Preparation	—	—	57.0	0.00	—
Grading	—	—	291	0.00	—
Paving	0.00	0.00	0.00	0.00	35.4

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Single Family Housing	15.7	0%

City Park	0.00	0%
Other Asphalt Surfaces	19.7	100%
Government Office Building	0.00	0%
City Park	0.00	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2026	0.00	375	0.01	< 0.005
2027	0.00	375	0.01	< 0.005
2028	0.00	375	0.01	< 0.005
2029	0.00	375	0.01	< 0.005
2030	0.00	375	0.01	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Single Family Housing	13,443	13,585	12,175	4,847,876	159,357	161,045	144,333	57,469,831
City Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Government Office Building	561	561	561	204,725	6,344	6,344	6,344	2,315,583
City Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
5623020	1,874,340	37,244	12,415	51,488

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Single Family Housing	12,685,307	375	0.0129	0.0017	56,007,542
City Park	0.00	375	0.0129	0.0017	0.00
Other Asphalt Surfaces	0.00	375	0.0129	0.0017	0.00
Government Office Building	571,673	375	0.0129	0.0017	826,051
City Park	0.00	375	0.0129	0.0017	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Single Family Housing	50,208,816	284,711,972
City Park	0.00	0.00
Other Asphalt Surfaces	0.00	6,083,739
Government Office Building	4,932,561	0.00
City Park	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Single Family Housing	938	—
City Park	0.00	—
Other Asphalt Surfaces	0.00	—
Government Office Building	23.1	—
City Park	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Single Family Housing	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Single Family Housing	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00
City Park	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0

City Park	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Government Office Building	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
Government Office Building	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	27.3	annual days of extreme heat
Extreme Precipitation	6.25	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	9.31	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters

Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	4	0	0	N/A
Extreme Precipitation	2	0	0	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	0	0	N/A
Flooding	0	0	0	N/A
Drought	0	0	0	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	4	1	1	4
Extreme Precipitation	2	1	1	3
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	1	1	2
Flooding	1	1	1	2
Drought	1	1	1	2
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	72.8
AQ-PM	13.2
AQ-DPM	66.6
Drinking Water	5.35
Lead Risk Housing	0.08
Pesticides	0.00
Toxic Releases	13.9
Traffic	66.8
Effect Indicators	—
CleanUp Sites	31.2
Groundwater	69.6
Haz Waste Facilities/Generators	93.1
Impaired Water Bodies	0.00
Solid Waste	0.00
Sensitive Population	—
Asthma	20.6

Cardio-vascular	50.6
Low Birth Weights	23.7
Socioeconomic Factor Indicators	—
Education	3.52
Housing	21.6
Linguistic	33.9
Poverty	12.7
Unemployment	49.9

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	94.14859489
Employed	95.85525472
Median HI	93.14769665
Education	—
Bachelor's or higher	92.17246247
High school enrollment	100
Preschool enrollment	87.30912357
Transportation	—
Auto Access	70.20402926
Active commuting	47.97895547
Social	—
2-parent households	88.63082253
Voting	95.05966893
Neighborhood	—
Alcohol availability	78.63467214

Park access	53.43256769
Retail density	12.51122803
Supermarket access	36.73809829
Tree canopy	76.73553189
Housing	—
Homeownership	71.32041576
Housing habitability	90.14500192
Low-inc homeowner severe housing cost burden	89.54189657
Low-inc renter severe housing cost burden	75.38816887
Uncrowded housing	75.52932119
Health Outcomes	—
Insured adults	93.18619274
Arthritis	87.4
Asthma ER Admissions	81.4
High Blood Pressure	79.9
Cancer (excluding skin)	45.0
Asthma	86.2
Coronary Heart Disease	93.8
Chronic Obstructive Pulmonary Disease	94.6
Diagnosed Diabetes	95.3
Life Expectancy at Birth	84.5
Cognitively Disabled	91.4
Physically Disabled	95.7
Heart Attack ER Admissions	47.2
Mental Health Not Good	90.0
Chronic Kidney Disease	93.4
Obesity	83.0
Pedestrian Injuries	19.6

Physical Health Not Good	95.9
Stroke	95.7
Health Risk Behaviors	—
Binge Drinking	14.4
Current Smoker	80.3
No Leisure Time for Physical Activity	96.0
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	44.4
Elderly	85.6
English Speaking	67.1
Foreign-born	46.0
Outdoor Workers	64.1
Climate Change Adaptive Capacity	—
Impervious Surface Cover	48.4
Traffic Density	62.2
Traffic Access	23.0
Other Indices	—
Hardship	12.8
Other Decision Support	—
2016 Voting	88.5

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	17.0
Healthy Places Index Score for Project Location (b)	97.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No

Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Land Use	Information changed to reflect details provided in the Project Description.
Construction: Construction Phases	Phasing changed to reflect expected construction schedule for the Project.
Operations: Vehicle Data	Traffic changed to reflect the nature of a fire station, as trips will be generated on the weekend as well.
Operations: Hearths	Hearths assumed to not be included in the Project.
Operations: Solid Waste	Parks and open space will not be generating waste.
Operations: Refrigerants	Parks and open space will not need refrigerants.

APPENDIX C

Alder Creek Property Project Roadway Construction

ECORP Consulting, Inc. July 2025

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/13/2025
Case Description: **Alder Creek: Building Construction**

Description	**Affected Land Use**
Building Construction	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**	**Estimated Shielding (dBA)**
Crane	No	16		80.6	50	0
Gradall	No	40		83.4	50	0
Gradall	No	40		83.4	50	0
Gradall	No	40		83.4	50	0
Generator	No	50		80.6	50	0
Tractor	No	40	84		50	0
Tractor	No	40	84		50	0
Tractor	No	40	84		50	0
Welder / Torch	No	40		74	50	0

Results

Calculated (dBA)

Equipment	***Lmax**	**Leq**
Crane	80.6	72.6
Gradall	83.4	79.4
Gradall	83.4	79.4
Gradall	83.4	79.4
Generator	80.6	77.6
Tractor	84	80
Tractor	84	80
Tractor	84	80
Welder / Torch	74	70
Total	84	**88.1**

*Calculated Lmax is the Loudest value.

APPENDIX D

Alder Creek Property Project Traffic Noise Levels

ECORP Consulting, Inc. July 2025.

TRAFFIC NOISE LEVELS

Project Number: 2024-012.01
Project Name: **Alder Creek Project**

Background Information

Model Description:	FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Analysis Scenario(s):	**Existing**
Source of Traffic Volumes:	Folsom Plan Area Specific Plan Draft EIR/EIS Baseline Traffic Volumes (2011)
Community Noise Descriptor:	L_{dn}: _____ CNEL: X

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Traffic Noise Levels

Analysis Condition Roadway Segment	Land Use	Lanes	Median Width	Peak Hour Volume	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor[1]	Alpha Factor	Barrier Attn. dB(A)	Vehicle Mix: Medium Trucks	Vehicle Mix: Heavy Trucks	Peak Hour dB(A) L_{eq}	24-Hour dB(A) CNEL
Prairie City Road without Project													
Between US 50 and White Rock Road	Project Site	4	32	1,223	11,008	55	50	0	0	1.8%	0.7%	**72.7**	**71.5**

[1] Distance is from the centerline of the roadway segment to the receptor location.

TRAFFIC NOISE LEVELS

Project Number: 2024-012.01
Project Name: **Alder Creek Project**

Background Information

Model Description:	FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Analysis Scenario(s):	**Existing + Project**
Source of Traffic Volumes:	Folsom Plan Area Specific Plan Draft EIR/EIS Baseline Traffic Volumes (2011) and CalEEMod Version 2022.1 Projected Daily Traffic Volumes Bas
Community Noise Descriptor:	L_{dn}: _____ CNEL: X

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

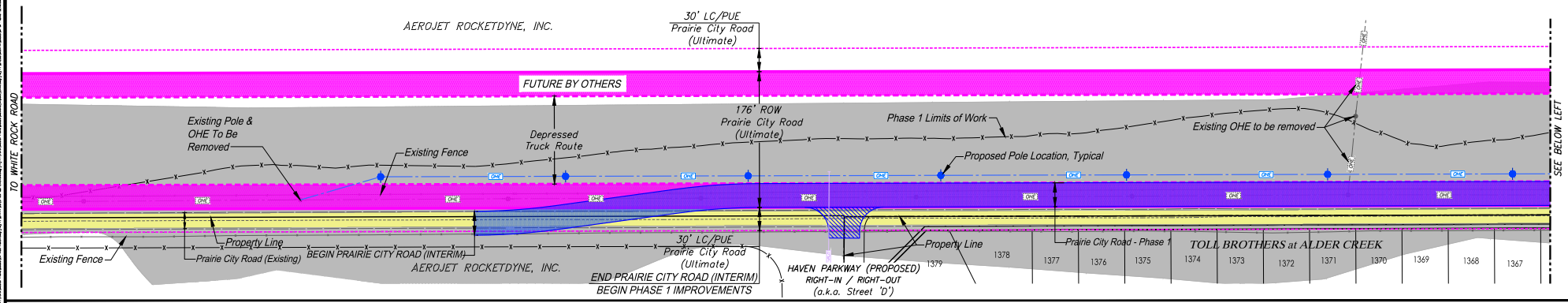
Traffic Noise Levels

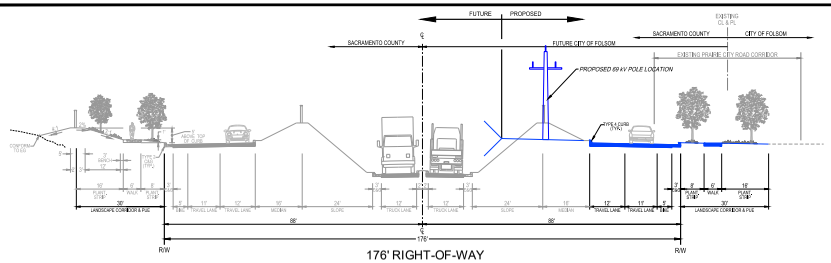
Analysis Condition Roadway Segment	Land Use	Lanes	Median Width	Peak Hour Volume	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor[1]	Alpha Factor	Barrier Attn. dB(A)	Vehicle Mix: Medium Trucks	Vehicle Mix: Heavy Trucks	Peak Hour dB(A) L_{eq}	24-Hour dB(A) CNEL
Prairie City Road with Project													
Between US 50 and White Rock Road	Project Site	4	32	2,795	25,154	55	50	0	0	1.8%	0.7%	**76.3**	**75.1**

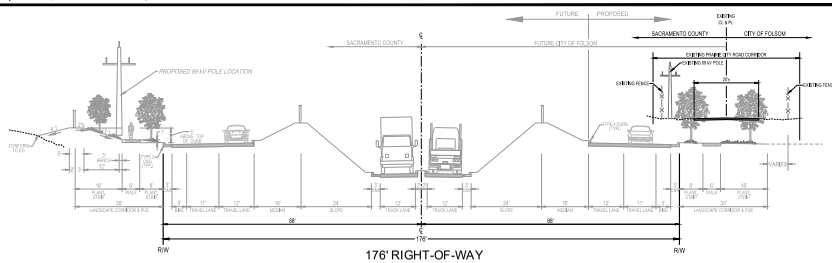
[1] Distance is from the centerline of the roadway segment to the receptor location.

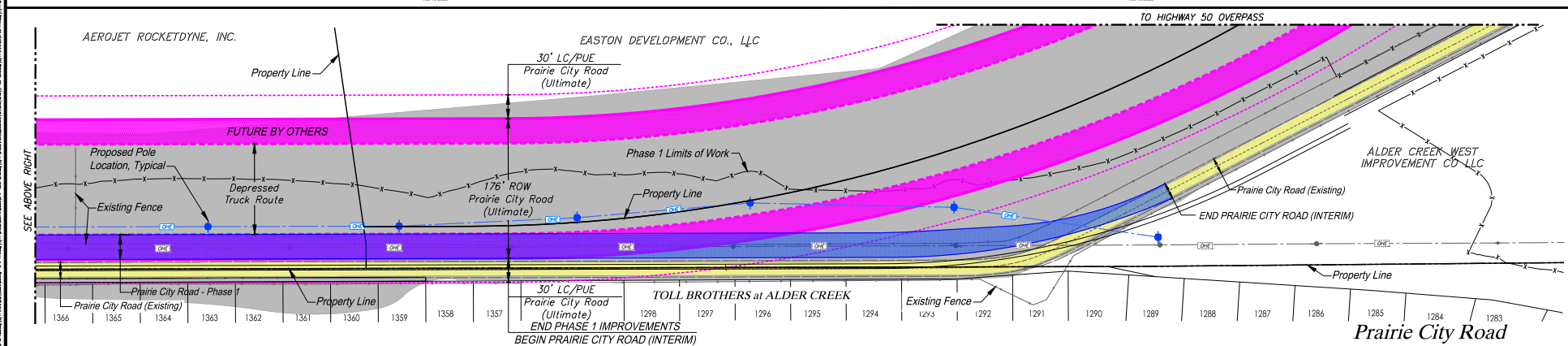
APPENDIX E

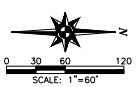
Prairie City Road Phase 1 Improvements and Interim Connections.
MacKay & Somps. August 2025.











Backbone Permit Limits

Prairie City Road
Phase 1 Improvements & Interim Connections

Toll Brothers

City of Folsom
Scale 1"=60'

MacKay & Somps
Civil Engineering · Planning · Surveying
1020 Colorado Ridge Drive, Suite 150, Rancho Cordova, CA 95670 (916) 175-1169

California
August 2025
27238.000

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Attachment 21

Kimley Horne Traffic Report and Circulation Study, dated April 1, 2025

Kimley»Horn

Memorandum

To: Mr. Martin Nivinski
Toll Brothers, Inc.

From: Bryant Lee, EIT
Matt Weir, PE, TE, PTOE, RSP_1

Re: ***Toll Brothers at Alder Creek***
Folsom Ranch – Folsom, California
Traffic, Access, and Circulation Study

Date: April 1, 2025

As requested and necessitated by the City of Folsom ("City"), we have prepared this memorandum to document our evaluation of traffic, access, and circulation conditions anticipated to result from the completion of the Toll Brothers at Alder Creek project (the "Proposed Project" or "Project"). The Project site plan and Project vicinity map are depicted in **Exhibit 1** and **Exhibit 2**, respectively. This evaluation was completed in a manner consistent with the City's requirements for similar projects within Folsom Ranch.

Overview

We understand that a "Traffic, Access, and Circulation Study" is required by the City for the Proposed Project. The project site generally described as the southwest portion of Folsom Ranch, primarily located within the vicinity of the Oak Avenue Parkway intersection with Mangini Parkway. While the project is understood to include nine (9) distinct development phases, the entire project (all 9 phases) is herein considered as the "project." Consistent with previous studies, the City has provided the following traffic study requirements:

- Project trip generation
- Project access, driveway location, and driveway spacing evaluation
- Internal vehicle circulation evaluation
- Emergency vehicle access evaluation

The primary purpose of this study was to inform both the near-term and build-out transportation network necessary to accommodate the addition of the Proposed Project. Specifically, this evaluation was used to identify the required infrastructure and access improvements along Oak Avenue Parkway and the unnamed Street D. Additional consideration was given to the project's Oak Avenue Parkway frontage interim/ultimate geometrics. Accordingly, a weekday AM and PM peak-hour intersection Level of Service (LOS) analysis was completed for the following scenarios:

- Near-Term (2025) plus Project (all phases)
- Build-Out (2045) plus Project (all phases)

The following intersections were included in this study to inform the recommended interim and ultimate transportation network configuration (see **Exhibit 2**):

1. Oak Avenue Parkway @ Mangini Parkway
2. Oak Avenue Parkway @ Street D
3. Prairie City Road @ Street D
4. Alder Creek Parkway @ Street F
5. Oak Avenue Parkway @ Street E

Development Assumptions and Trip Generation

The study assumes the following development and network parameters:

A. Near-Term (2025) plus Project
   - Scenario includes peak-hour volumes collected on January 30, 2025, combined with manually generated and assigned Project trips
   - Scenario assumes build-out of all nine Project phases
   - The localized transportation network is defined as follows:
     - 2-lane Oak Avenue Parkway
     - Street D connection to Prairie City Road (right-in/right-out access only)
     - No Oak Avenue Parkway connection to Alder Creek Parkway

B. Build-Out (2045) plus Project
   - Scenario includes Build-Out (2045) peak-hour volumes established using the City's Travel Demand Model (TDM), representative of build-out of planned development within the general project vicinity[1] and the associated transportation network, combined with the assigned Project trips
   - Scenario assumes build-out of all nine Project phases
   - The localized transportation network is defined as follows:
     - 2-lane Oak Avenue Parkway
     - Street D connection to Prairie City Road (full access)
     - Oak Avenue Parkway connection to Alder Creek Parkway (2-lane roadway)

The City's *Specific Plan*[2] illustrates the allocated dwelling units for all nine (9) phases of development (totaling 1,520 dwelling units). The Project site plan (**Exhibit 1**) depicts the project's land uses and dwelling units (totaling approximately 1,420 single and multi-family units). Therefore, the Project is consistent with and less intense than the *Specific Plan's* land use assumptions.

The number of trips anticipated to be generated by the Proposed Project was approximated using the *Trip Generation Manual*, *11th Edition*, published by the Institute of Transportation Engineers (ITE). Project trips were assigned to the surrounding transportation network based on the City's travel demand model (TDM) and professional judgment. The project trip distribution is shown in **Exhibit 3**. As shown in **Table 1**, the complete Proposed Project (assuming construction of all nine phases) is estimated to generate 12,154 daily trips, with 854 occurring in the weekday AM peak-hour and 1,134 occurring in the weekday PM peak-hour.

Table 1 – Proposed Project Trip Generation

Land Use (ITE Code)	Size	Daily Trips	AM Peak-Hour					PM Peak-Hour				
			Total Trips	In		Out		Total Trips	In		Out	
				%	Trips	%	Trips		%	Trips	%	Trips
Single-Family Detached Housing (LU 210)[1]	956 DU	9,016	669	26%	174	74%	495	899	63%	566	37%	333
Multifamily Housing (Low-Rise) (LU 220)[1]	464 DU	3,376	203	25%	50	75%	153	261	63%	164	37%	97
Net External Trips		12,392	872		224		648	1,160		730		430

DU = Dwelling Units

Source: [1]Trip Generation Manual, 11th Edition

[1] *City of Folsom – SACOG Increasing Residential Capacities Implementation (REAP) Traffic Analysis*, Kimley-Horn, April 17, 2024.
[2] Figure 4.3, Section 4 Land Use, *Folsom Plan Area Specific Plan*, City of Folsom, April 2024.

The study facilities, traffic control, lane configurations, and turning movement volumes for Near-Term (2025) plus Project and Build-Out (2045) plus Project conditions are depicted in **Exhibit 4** and **Exhibit 5**, respectively.

Analysis Results

Intersection LOS was determined using methods defined in the *Highway Capacity Manual, 7th Edition,* using appropriate traffic analysis software (Synchro®). The City's operational threshold[3] of LOS D was used to establish the necessary infrastructure improvements which allow all intersections to operate acceptably and provide adequate turn lane storage to contain anticipated queuing. Traffic control assumptions were based on existing conditions and information contained in the *Folsom Plan Area Specific Plan*[4]. The following traffic control assumptions are inherent to the analyses documented herein:

1. Oak Avenue Parkway @ Mangini Parkway
   - Near-Term: All-Way Stop Control (AWSC)
   - Build-Out: Signal
2. Oak Avenue Parkway @ Street D – AWSC
3. Prairie City Road @ Street D
   - Near-Term: Side-Street Stop Control (SSSC), right-in/right-out
   - Build-Out: Signal
4. Alder Creek Parkway @ Street F – SSSC, full access
5. Oak Avenue Parkway @ Street E – SSSC, full access

Table 2 summarizes the peak-hour intersection LOS analysis results. As shown in **Table 2**, all intersections are expected to operate at LOS D or better for Near-Term (2025) and Build-Out (2045) plus Project conditions. Analysis worksheets are provided in **Appendix A** and **Appendix B**.

Table 2 – Intersection Levels of Service

ID	Intersection	Control	Peak Hour	Near-Term (2025) plus Project		Build-Out (2045) plus Project	
				Delay [sec]	LOS	Delay [sec]	LOS
1	Oak Avenue Pkwy @ Mangini Pkwy	AWSC/Signal	AM	9.4	A	14.7	B
			PM	11.8	B	14.5	B
2	Oak Avenue Pkwy @ Street D	AWSC	AM	8.6	A	11.5	B
			PM	8.9	A	12.2	B
3	Prairie City Dr @ Street D	SSSC/Signal	AM	24.6	C	15.0	B
			PM	15.8	C	14.8	B
4	Alder Creek Pkwy @ Street F	SSSC	AM	9.1	A	13.5	B
			PM	9.3	A	17.0	C
5	Oak Avenue Pkwy @ Street E	SSSC	AM	8.6	A	12.5	B
			PM	8.7	A	13.2	B

Note: **Bold** represents unacceptable conditions. Shaded cells represent project induced deficiencies.
Side Street Stop Controlled (SSSC) intersections are reported by the worst approach's delay. The reported LOS corresponds to the worst

Vehicle queuing was also evaluated for the analysis scenarios summarized in **Table 3** using 95th percentile queue as calculated in Synchro®. Storage lengths for turn lanes that do not currently exist are informed by the City Design Standards[5]. As shown in **Table 3**, the available/potential storage will contain the vehicle queues with the addition of trips generated by the Proposed Project. Analysis worksheets for Near-Term (2025) plus Project conditions are provided in **Appendix A**. Analysis worksheets for Build-Out (2045) plus Project conditions are provided in **Appendix B**.

[3] Mobility Element, *Folsom 2035 General Plan,* City of Folsom, July 2024.
[4] Section 7 Circulation, *Folsom Plan Area Specific Plan*, City of Folsom, April 2024.
[5] Section 12 Site Access, *Folsom Design Standards*, City of Folsom, February 2020.

Table 3 – Intersection Queuing

Intersection / Analysis Scenario	Movement	Available/ Potential Storage (ft)	95%-tile Queue (ft)	
			AM Peak-Hour	PM Peak-Hour
#1, Oak Avenue Pkwy @ Mangini Pkwy	NBL			
Near-Term (2025) plus Project		250	0	5
Build-Out (2045) plus Project			17	17
	SBL			
Near-Term (2025) plus Project		250	30	20
Build-Out (2045) plus Project			34	33
	EBL			
Near-Term (2025) plus Project		150	0	0
Build-Out (2045) plus Project			34	26
	WBL			
Near-Term (2025) plus Project		400	5	5
Build-Out (2045) plus Project			55	53
#2, Oak Avenue Pkwy @ Street D	NBL			
Near-Term (2025) plus Project		250	20	30
Build-Out (2045) plus Project			45	50
	SBL			
Near-Term (2025) plus Project		250	0	0
Build-Out (2045) plus Project			5	10
#3, Prairie City Dr @ Street D	SBL			
Build-Out (2045) plus Project		300	120	168
	WBL			
Build-Out (2045) plus Project		150	13	13
#4, Alder Creek Pkwy @ Street F	WBL			
Build-Out (2045) plus Project		250	10	5
#5, Oak Avenue Pkwy @ Street E	SBL			
Near-Term (2025) plus Project		250	0	0
Build-Out (2045) plus Project			0	5

Note: Cell shaded orange where queue exceeds capacity by >1 vehicle length (25 feet)

Additional Considerations

Internal Vehicle Circulation and General Access Control

Per the project site plan (**Exhibit 1**), the planned neighborhood driveways provide adequate spacing relative to intersections and other driveways[5]. Neighborhood streets accessing arterials and collectors are recommended to be side-street stop control allowing full-access.

To satisfy the City of Folsom Fire Code[6], emergency vehicle access roads shall have an unobstructed width of 20-feet and an unobstructed height of 13.5-feet. The required turning radius of a fire apparatus access road shall have a minimum dimension of 25-feet on the inside and 50-feet on the outside. A qualitative review of the project site plan indicates that the Project design satisfies the basic geometric elements required by the Fire Code. Final design of the emergency vehicle access roads in conformance with the Fire Code is the responsibility of the Project's design engineer.

[6] *Folsom Municipal Code*, City of Folsom, October 22, 2024.

Bicycle/Pedestrian Considerations

Per the *Specific Plan*[4], sidewalks are planned along all project roadways. Class II bike lanes are planned along Oak Avenue Parkway, Alder Creek Parkway, Mangini Parkway, Street D, and Prairie City Road. Class I bike paths are also planned in the open space and crosses Street D and Oak Avenue Parkway.

Near Intersection #5 (Oak Avenue Parkway @ Street E), the *Specific Plan*[4] proposes an at-grade pedestrian crossing. As this crossing may see frequent use by trail users, cyclists, and local residents, active crossing control is recommended. Based on the FHWA Guidance[7], a rectangular rapid-flashing beacon (RRFB) or a pedestrian hybrid beacon should be considered based on the combination of projected through vehicular volume, roadway width, and other roadway characteristics of Oak Avenue Parkway. It is recommended that the Project install high-visibility crosswalk markings, warning signs, and lighting for pedestrian safety.

Intersection Control Evaluation (ICE)

An Intersection Control Evaluation (provided as **Attachment C**) was completed for Intersection #1 (Oak Avenue Parkway @ Mangini Parkway), Intersection #2 (Oak Avenue Parkway @ Street D), and Intersection #3 (Prairie City Road @ Street D). The evaluations were completed to enable an objective comparison of intersection control alternatives' performance measures as identified below:

1. Oak Avenue Parkway @ Mangini Parkway – Signal, Roundabout
2. Oak Avenue Parkway @ Street D – AWSC, Roundabout
3. Prairie City Road @ Street D – Signal, Roundabout

Four key quantitative performance measures were used to determine the benefits of proposed improvements:

- Delay Reduction Benefit: The delay reduction benefit is a measure of the societal cost associated with the number of person-hours of delay at the study intersection during the study period. Components used to calculate the delay reduction benefit include peak hour delay, average vehicle occupancy (AVO), and the value of travel time savings (VTTS).
- Safety Benefit: The safety benefit is a measure of the societal cost associated with the predicted number and severity of crashes that may occur based on the intersection control type, intersection configuration, physical setting, and volume of traffic.
- Operations and Maintenance Costs: The operations and maintenance (O&M) cost is a measure of the added annual cost to operate and maintain the proposed intersection control alternative. These costs include annual power consumption for lighting, signal power consumption, signal timing, equipment replacement, pavement management, and landscape maintenance amongst others.
- Initial Capital Costs: The initial capital cost is a measure of the added cost to construct the proposed improvements. A range of estimated order of magnitude costs was developed for the proposed improvements based on engineer's judgement.

A Benefit-Cost (B/C) ratio was developed using the quantitative performance measures described above. The B/C ratio measures the expected return on investment between intersection control alternatives. If only one alternative has a positive B/C, it will be the preferred alternative. If no proposed alternatives generate a B/C greater than one, then the existing control will be the preferred alternative. The alternative with the greatest benefit compared to the cost will be the preferred alternative.

In addition to the key performance measures mentioned above, consideration is also given to qualitative measures. Some of these measures include presence and width of sidewalks, presence and class of bike

[7] *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*, USDOT FHWA, July 2018.

lanes, and required right-of-way acquisition. For each scenario, existing site constraints have been considered to determine feasible improvements that will provide the greatest operational and safety benefits. The traffic control for each intersection that had the highest B/C ratio relative to the considered alternatives is identified below:

1. Oak Avenue Parkway @ Mangini Parkway – Roundabout
2. Oak Avenue Parkway @ Street D – Roundabout
3. Prairie City Road @ Street D – Roundabout

Summary of Findings

Based on the analyses documented herein, we offer the following summary of our findings:

- Under Near-Term (2025) conditions with all nine (9) development phases assumed to be fully occupied, the transportation network is shown to operate adequately with the addition of the Proposed Project under the following network and traffic control assumptions:
    - Roadway Segments/Connections:
        - 2-lane Oak Avenue Parkway (1 through lane in each direction)
        - Street D connection to Prairie City Road
        - No Oak Avenue Parkway connection to Alder Creek Parkway
    - Intersection Traffic Control:
        - Oak Avenue Parkway @ Mangini Parkway – All-Way Stop Control (AWSC)
        - Oak Avenue Parkway @ Street D – AWSC
        - Prairie City Road @ Street D – SSSC, (right-in/right-out access only)
        - Alder Creek Parkway @ Street F – SSSC, full access
        - Oak Avenue Parkway @ Street E – SSSC, full access
- Under Build-Out (2045) conditions with all nine (9) development phases assumed to be fully occupied, conditions representative of build-out of planned development within the general project vicinity and the associated transportation network, combined with the assigned Project trips is shown to operate adequately with the addition of the Proposed Project under the following network and traffic control assumptions :
    - Roadway Segments/Connections:
        - 2-lane Oak Avenue Parkway (1 through lane in each direction)
        - Street D connection to Prairie City Road (full access)
        - Oak Avenue Parkway connection to Alder Creek Parkway (2-lane roadway)
    - Intersection Traffic Control:
        - Oak Avenue Parkway @ Mangini Parkway – Signal
        - Oak Avenue Parkway @ Street D – AWSC
        - Prairie City Road @ Street D – Signal
        - Alder Creek Parkway @ Street F – SSSC, full access
        - Oak Avenue Parkway @ Street E – SSSC, full access
- Based on the FHWA Guidance[7], a rectangular rapid-flashing beacon or a pedestrian hybrid beacon should be considered at the at-grade crossing along Oak Avenue Parkway near the northern project limit. It is also recommended to install high-visibility crosswalk markings, warning signs, and lighting for pedestrian safety.
- Although the intersections operate acceptably with the aforementioned intersection control assumptions, the following intersection control types would yield a higher return on investment per the analysis completed in the Intersection Control Evaluation (ICE):
    - Oak Avenue Parkway @ Mangini Parkway – Roundabout
    - Oak Avenue Parkway @ Street D – Roundabout
    - Prairie City Road @ Street D – Roundabout

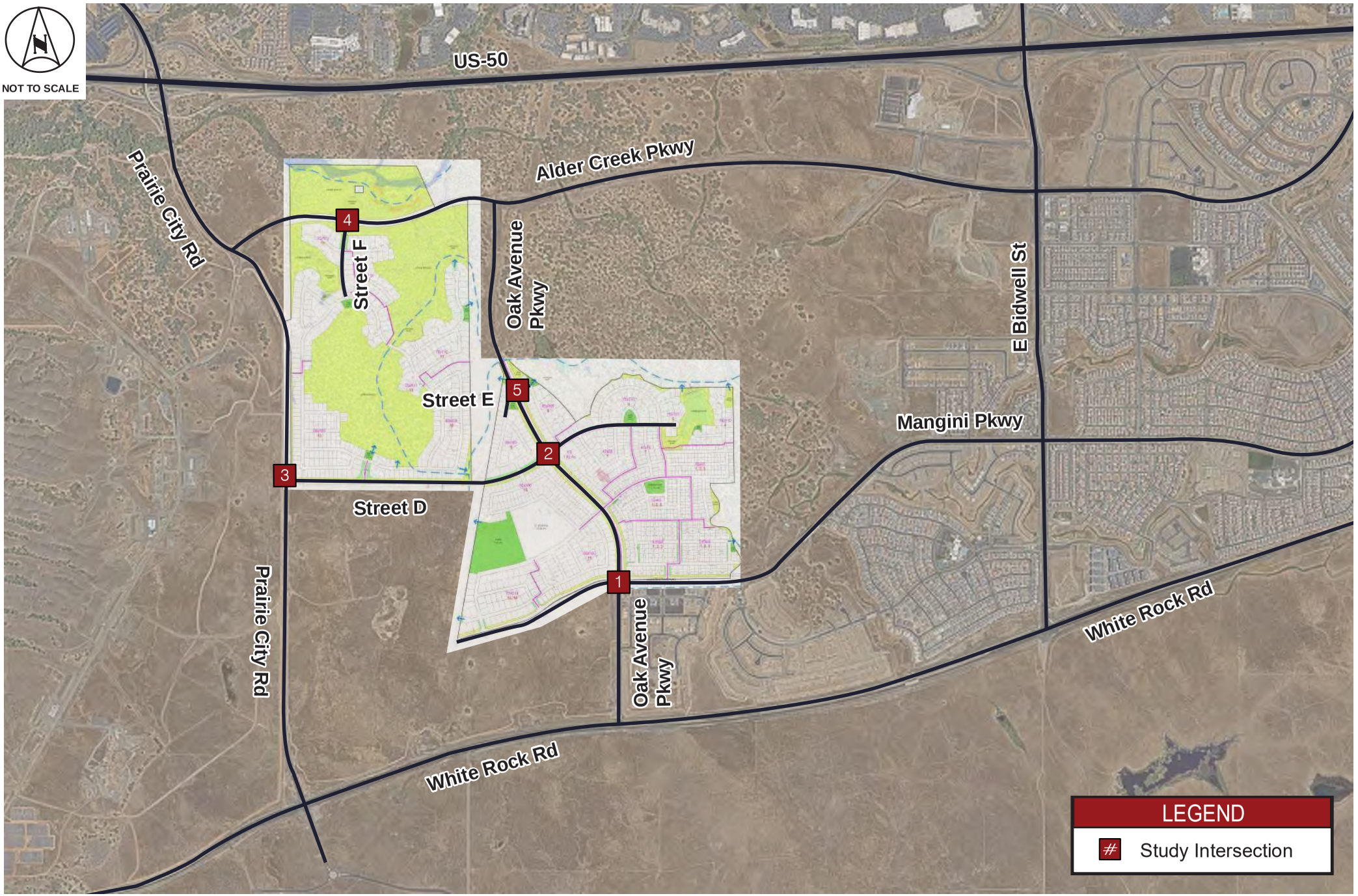
Attachments

Exhibit 1 – Project Site Plan
Exhibit 2 – Project Vicinity Map
Exhibit 3 – Project Trip Distribution
Exhibit 4 – Near-Term (2025) plus Project Study Facilities, Traffic Control, Lane Configuration, and Volumes
Exhibit 5 – Build-Out (2045) plus Project Study Facilities, Traffic Control, Lane Configuration, and Volumes

Attachment A – Analysis Worksheets for Near-Term (2025) plus Project Conditions
Attachment B – Analysis Worksheets for Build-Out (2045) plus Project Conditions
Attachment C – Intersection Control Evaluation (ICE) Memorandum

Source: MacKay & Somps, November 22, 2024

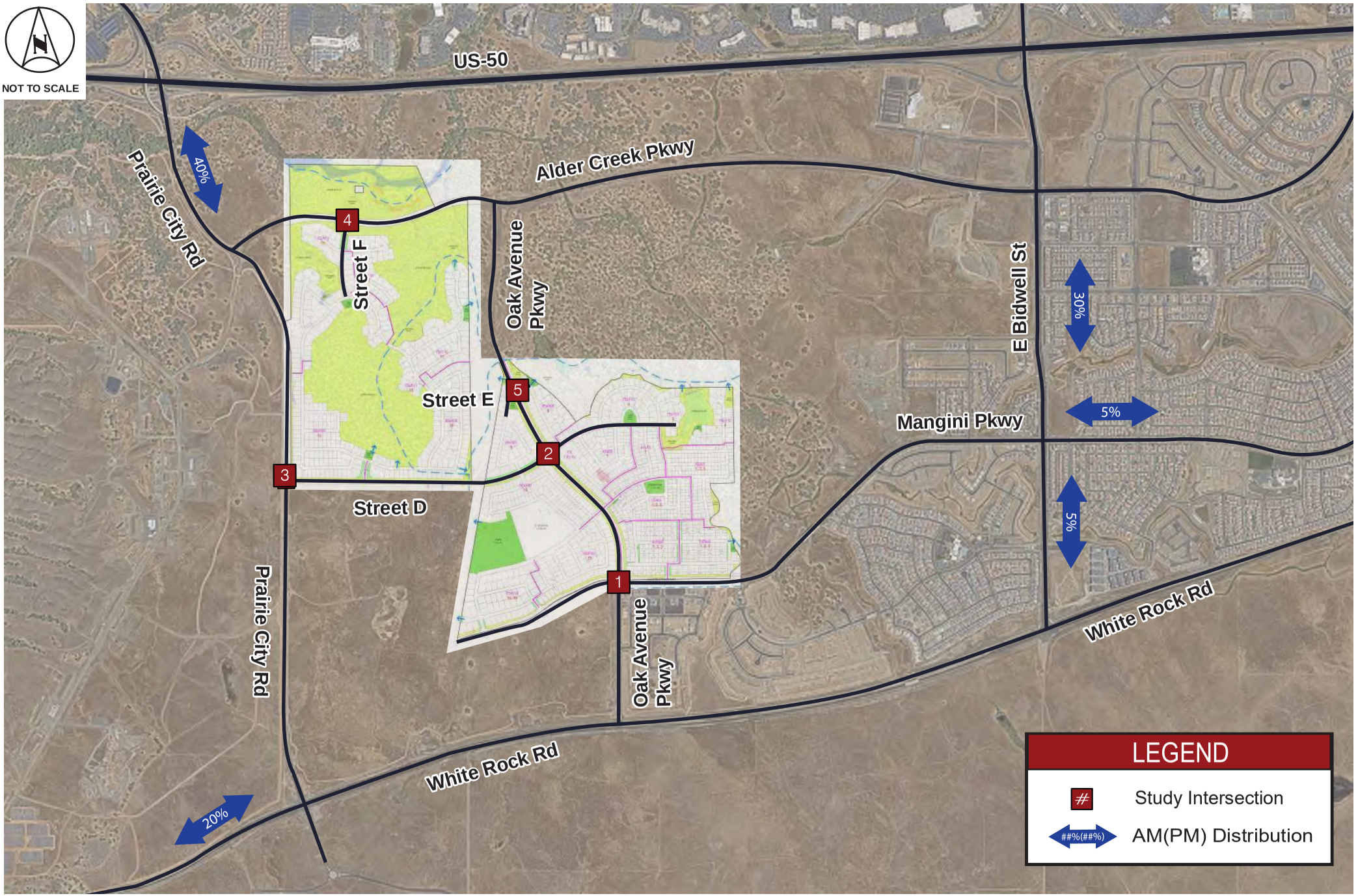
Toll Brothers at Alder Creek



Kimley»Horn

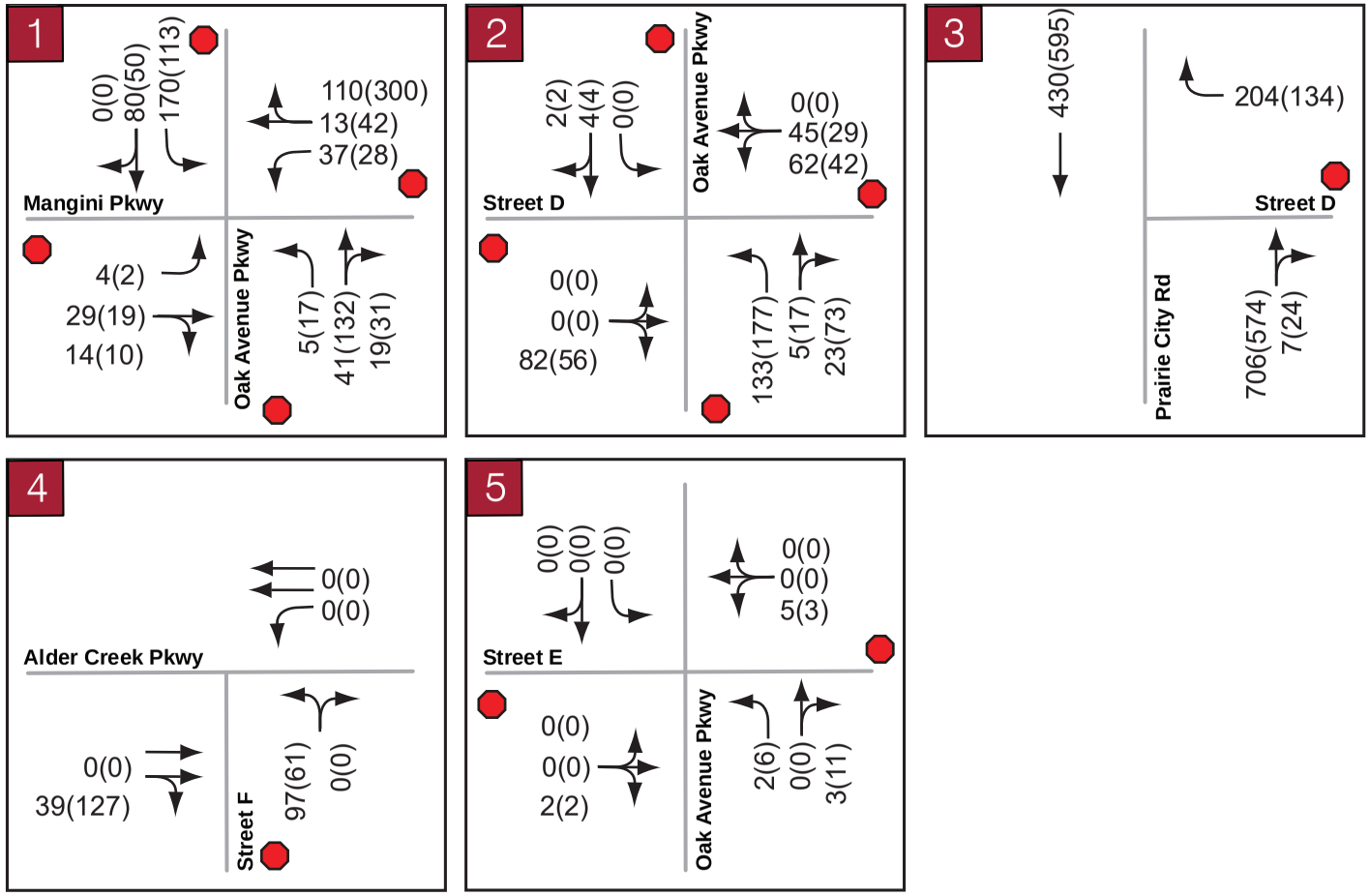
Exhibit 2
Project Vicinity Map

Toll Brothers at Alder Creek



Kimley»Horn

Exhibit 3
Project Trip Distribution

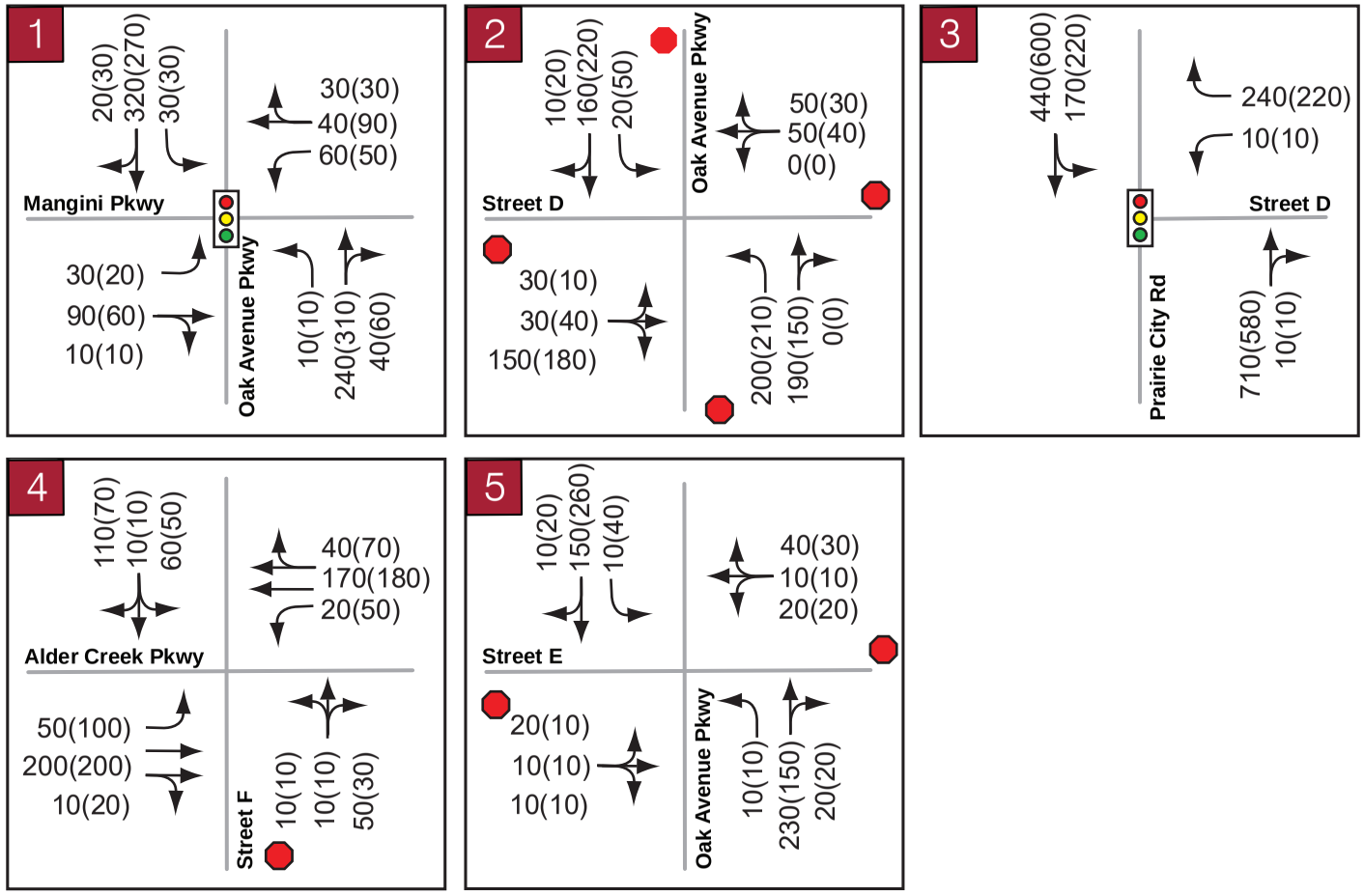


LEGEND					
#	Study Intersection	##(##)	AM(PM) Peak-hour Volume		Stop Control Aproach

Kimley»Horn

Exhibit 4

Near-Term (2025) plus Project Study Facilities, Traffic Control, Lane Configuration, and Volumes



LEGEND

#	Study Intersection	##(##)	AM(PM) Peak-hour Volume		Stop Control Aproach		Signalized Intersection

Kimley»Horn

Figure 5

Build-Out (2045) plus Project Study Facilities, Traffic Control, Lane Configuration, and Volumes

Attachment A

Analysis Worksheets for Near-Term (2025) plus Project Conditions

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	29	14	37	13	110	5	41	19	170	80	0
Future Vol, veh/h	4	29	14	37	13	110	5	41	19	170	80	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	32	15	40	14	120	5	45	21	185	87	0
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay, s/veh	8.6	8.8	8.5	10.1
HCM LOS	A	A	A	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	68%	0%	67%	0%	11%	0%	100%
Vol Right, %	0%	32%	0%	33%	0%	89%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	60	4	43	37	123	170	80
LT Vol	5	0	4	0	37	0	170	0
Through Vol	0	41	0	29	0	13	0	80
RT Vol	0	19	0	14	0	110	0	0
Lane Flow Rate	5	65	4	47	40	134	185	87
Geometry Grp	5	5	5	5	5	5	5	5
Degree of Util (X)	0.009	0.094	0.007	0.07	0.067	0.18	0.291	0.125
Departure Headway (Hd)	5.901	5.174	6.13	5.396	5.993	4.86	5.667	5.165
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	604	689	582	661	597	737	634	692
Service Time	3.658	2.931	3.886	3.152	3.737	2.603	3.413	2.911
HCM Lane V/C Ratio	0.008	0.094	0.007	0.071	0.067	0.182	0.292	0.126
HCM Control Delay, s/veh	8.7	8.5	8.9	8.6	9.2	8.7	10.7	8.7
HCM Lane LOS	A	A	A	A	A	A	B	A
HCM 95th-tile Q	0	0.3	0	0.2	0.2	0.7	1.2	0.4

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	82	62	45	0	133	5	23	0	4	2
Future Vol, veh/h	0	0	82	62	45	0	133	5	23	0	4	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	89	67	49	0	145	5	25	0	4	2
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay, s/veh	7.4	8.5	9.4	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	58%	0%	0%
Vol Thru, %	0%	18%	0%	42%	100%	67%
Vol Right, %	0%	82%	100%	0%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	133	28	82	107	0	6
LT Vol	133	0	0	62	0	0
Through Vol	0	5	0	45	0	4
RT Vol	0	23	82	0	0	2
Lane Flow Rate	145	30	89	116	0	7
Geometry Grp	5	5	2	2	5	5
Degree of Util (X)	0.221	0.037	0.098	0.15	0	0.009
Departure Headway (Hd)	5.496	4.417	3.958	4.628	5.172	4.937
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	655	811	907	777	0	725
Service Time	3.221	2.142	1.974	2.643	2.902	2.667
HCM Lane V/C Ratio	0.221	0.037	0.098	0.149	0	0.01
HCM Control Delay, s/veh	9.8	7.3	7.4	8.5	7.9	7.7
HCM Lane LOS	A	A	A	A	N	A
HCM 95th-tile Q	0.8	0.1	0.3	0.5	0	0

Intersection	
Int Delay, s/veh	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	204	706	7	0	430
Future Vol, veh/h	0	204	706	7	0	430
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	222	767	8	0	467

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	771	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	400	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	400	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	24.64	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	400	-
HCM Lane V/C Ratio	-	-	0.554	-
HCM Control Delay (s/veh)	-	-	24.6	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	3.3	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	39	0	0	97	0
Future Vol, veh/h	0	39	0	0	97	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	42	0	0	105	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	42	0	22	21
Stage 1	-	-	-	-	21	-
Stage 2	-	-	-	-	1	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1565	-	992	1051
Stage 1	-	-	-	-	998	-
Stage 2	-	-	-	-	1022	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1565	-	992	1051
Mov Cap-2 Maneuver	-	-	-	-	992	-
Stage 1	-	-	-	-	998	-
Stage 2	-	-	-	-	1022	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	9.06
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	992	-	-	1565	-
HCM Lane V/C Ratio	0.106	-	-	-	-
HCM Control Delay (s/veh)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	2	5	0	0	2	0	3	0	0	0
Future Vol, veh/h	0	0	2	5	0	0	2	0	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	2	5	0	0	2	0	3	0	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	5	9	1	7	7	2	1	0	0	3	0	0
Stage 1	1	1	-	6	6	-	-	-	-	-	-	-
Stage 2	4	8	-	1	1	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	1015	886	1083	1013	888	1083	1622	-	-	1619	-	-
Stage 1	1022	895	-	1016	891	-	-	-	-	-	-	-
Stage 2	1018	889	-	1022	895	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	1014	885	1083	1009	887	1083	1622	-	-	1619	-	-
Mov Cap-2 Maneuver	1014	885	-	1009	887	-	-	-	-	-	-	-
Stage 1	1022	895	-	1015	890	-	-	-	-	-	-	-
Stage 2	1017	888	-	1020	895	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	8.33	8.59	2.89	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1622	-	-	1083	1009	1619	-	-
HCM Lane V/C Ratio	0.001	-	-	0.002	0.005	-	-	-
HCM Control Delay (s/veh)	7.2	-	-	8.3	8.6	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Intersection	
Intersection Delay, s/veh	11.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Vol, veh/h	2	19	10	1	28	42	300	17	132	31	113	50
Future Vol, veh/h	2	19	10	1	28	42	300	17	132	31	113	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	21	11	1	30	46	326	18	143	34	123	54
Number of Lanes	1	1	0	0	1	1	0	1	1	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay, s/veh	9	13	10.8	10.5
HCM LOS	A	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	81%	0%	66%	0%	12%	0%	100%
Vol Right, %	0%	19%	0%	34%	0%	88%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	17	163	2	29	29	342	113	50
LT Vol	17	0	2	0	29	0	113	0
Through Vol	0	132	0	19	0	42	0	50
RT Vol	0	31	0	10	0	300	0	0
Lane Flow Rate	18	177	2	32	32	372	123	54
Geometry Grp	5	5	5	5	5	5	5	5
Degree of Util (X)	0.033	0.287	0.004	0.052	0.054	0.526	0.221	0.09
Departure Headway (Hd)	6.48	5.84	6.691	5.939	6.215	5.091	6.492	5.987
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	553	617	535	603	580	714	554	599
Service Time	4.211	3.571	4.427	3.674	3.915	2.791	4.224	3.718
HCM Lane V/C Ratio	0.033	0.287	0.004	0.053	0.055	0.521	0.222	0.09
HCM Control Delay, s/veh	9.4	10.9	9.5	9	9.3	13.3	11.1	9.3
HCM Lane LOS	A	B	A	A	A	B	B	A
HCM 95th-tile Q	0.1	1.2	0	0.2	0.2	3.1	0.8	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBR
Lane Configurations	
Traffic Vol, veh/h	0
Future Vol, veh/h	0
Peak Hour Factor	0.92
Heavy Vehicles, %	2
Mvmt Flow	0
Number of Lanes	0

Approach	
Opposing Approach	
Opposing Lanes	
Conflicting Approach Left	
Conflicting Lanes Left	
Conflicting Approach Right	
Conflicting Lanes Right	
HCM Control Delay, s/veh	
HCM LOS	

Intersection	
Intersection Delay, s/veh	8.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	56	42	29	0	177	17	73	0	4	2
Future Vol, veh/h	0	0	56	42	29	0	177	17	73	0	4	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	61	46	32	0	192	18	79	0	4	2
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay, s/veh	7.5	8.4	9.3	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	59%	0%	0%
Vol Thru, %	0%	19%	0%	41%	100%	67%
Vol Right, %	0%	81%	100%	0%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	177	90	56	71	0	6
LT Vol	177	0	0	42	0	0
Through Vol	0	17	0	29	0	4
RT Vol	0	73	56	0	0	2
Lane Flow Rate	192	98	61	77	0	7
Geometry Grp	5	5	2	2	5	5
Degree of Util (X)	0.282	0.114	0.07	0.104	0	0.009
Departure Headway (Hd)	5.279	4.209	4.149	4.839	5.124	4.89
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	671	837	867	745	0	733
Service Time	3.079	2.008	2.155	2.843	2.846	2.611
HCM Lane V/C Ratio	0.286	0.117	0.07	0.103	0	0.01
HCM Control Delay, s/veh	10.2	7.6	7.5	8.4	7.8	7.7
HCM Lane LOS	B	A	A	A	N	A
HCM 95th-tile Q	1.2	0.4	0.2	0.3	0	0

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	134	574	24	0	595
Future Vol, veh/h	0	134	574	24	0	595
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	146	624	26	0	647

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	637	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	477	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	477	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	15.82	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	477	-
HCM Lane V/C Ratio	-	-	0.305	-
HCM Control Delay (s/veh)	-	-	15.8	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	1.3	-

Intersection	
Int Delay, s/veh	3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	127	0	0	61	0
Future Vol, veh/h	0	127	0	0	61	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	138	0	0	66	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	138	0	70	69
Stage 1	-	-	-	-	69	-
Stage 2	-	-	-	-	1	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1443	-	927	980
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	1022	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1443	-	927	980
Mov Cap-2 Maneuver	-	-	-	-	927	-
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	1022	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	9.18
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	927	-	-	1443	-
HCM Lane V/C Ratio	0.072	-	-	-	-
HCM Control Delay (s/veh)	9.2	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	2	3	0	0	6	0	11	0	0	0
Future Vol, veh/h	0	0	2	3	0	0	6	0	11	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	2	3	0	0	7	0	12	0	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	14	26	1	20	20	6	1	0	0	12	0	0
Stage 1	1	1	-	19	19	-	-	-	-	-	-	-
Stage 2	13	25	-	1	1	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	1002	867	1083	993	874	1077	1622	-	-	1607	-	-
Stage 1	1022	895	-	1000	879	-	-	-	-	-	-	-
Stage 2	1007	874	-	1022	895	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	998	864	1083	987	870	1077	1622	-	-	1607	-	-
Mov Cap-2 Maneuver	998	864	-	987	870	-	-	-	-	-	-	-
Stage 1	1022	895	-	996	876	-	-	-	-	-	-	-
Stage 2	1003	871	-	1020	895	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	8.33	8.66	2.55	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1622	-	-	1083	987	1607	-	-
HCM Lane V/C Ratio	0.004	-	-	0.002	0.003	-	-	-
HCM Control Delay (s/veh)	7.2	-	-	8.3	8.7	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Attachment B

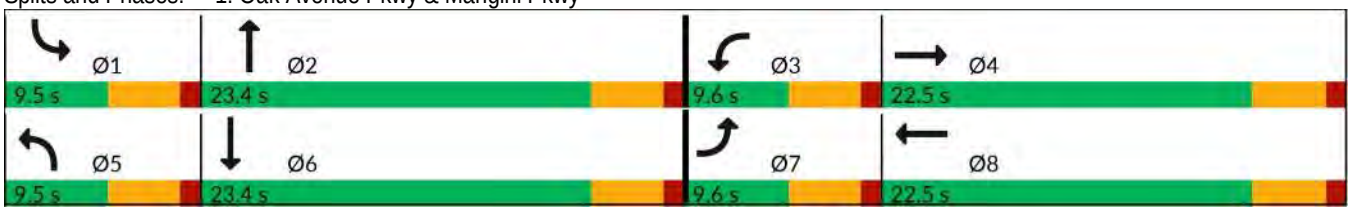
Analysis Worksheets for Build-Out (2045) plus Project Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	90	10	60	40	30	10	240	40	30	320	20
Future Volume (vph)	30	90	10	60	40	30	10	240	40	30	320	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	400		0	200		132	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.985			0.935			0.979			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1835	0	1770	1742	0	1770	1824	0	1770	1846	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1835	0	1770	1742	0	1770	1824	0	1770	1846	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			33			13			5	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		290			615			346			357	
Travel Time (s)		4.9			10.5			5.9			6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	109	0	65	76	0	11	304	0	33	370	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.6	22.5		9.6	22.5		9.5	23.4		9.5	23.4	
Total Split (%)	14.8%	34.6%		14.8%	34.6%		14.6%	36.0%		14.6%	36.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.9	8.5		5.9	10.2		5.8	23.4		5.8	24.9	
Actuated g/C Ratio	0.15	0.21		0.15	0.26		0.15	0.59		0.15	0.63	
v/c Ratio	0.13	0.27		0.25	0.16		0.04	0.28		0.13	0.32	
Control Delay (s/veh)	23.3	18.1		24.1	12.3		23.0	12.6		23.5	11.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	23.3	18.1		24.1	12.3		23.0	12.6		23.5	11.4	
LOS	C	B		C	B		C	B		C	B	
Approach Delay (s/veh)		19.3			17.7			13.0			12.4	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	7	19		13	5		2	49		7	64	
Queue Length 95th (ft)	34	68		55	42		17	146		34	184	
Internal Link Dist (ft)		210			535			266			277	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	150			400			200			200		
Base Capacity (vph)	261	960		261	923		256	1103		256	1154	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.11		0.25	0.08		0.04	0.28		0.13	0.32	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 39.8			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.32			
Intersection Signal Delay (s/veh): 14.3		Intersection LOS: B	
Intersection Capacity Utilization 42.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Oak Avenue Pkwy & Mangini Pkwy



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	90	10	60	40	30	10	240	40	30	320	20
Future Volume (veh/h)	30	90	10	60	40	30	10	240	40	30	320	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	98	11	65	43	33	11	261	43	33	348	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	70	207	23	119	150	115	26	399	66	70	487	31
Arrive On Green	0.04	0.13	0.13	0.07	0.15	0.15	0.01	0.26	0.26	0.04	0.28	0.28
Sat Flow, veh/h	1781	1652	185	1781	982	753	1781	1566	258	1781	1741	110
Grp Volume(v), veh/h	33	0	109	65	0	76	11	0	304	33	0	370
Grp Sat Flow(s),veh/h/ln	1781	0	1837	1781	0	1735	1781	0	1824	1781	0	1851
Q Serve(g_s), s	0.6	0.0	1.9	1.2	0.0	1.4	0.2	0.0	5.2	0.6	0.0	6.3
Cycle Q Clear(g_c), s	0.6	0.0	1.9	1.2	0.0	1.4	0.2	0.0	5.2	0.6	0.0	6.3
Prop In Lane	1.00		0.10	1.00		0.43	1.00		0.14	1.00		0.06
Lane Grp Cap(c), veh/h	70	0	231	119	0	266	26	0	465	70	0	518
V/C Ratio(X)	0.47	0.00	0.47	0.55	0.00	0.29	0.43	0.00	0.65	0.47	0.00	0.71
Avail Cap(c_a), veh/h	259	0	943	259	0	891	254	0	983	254	0	997
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.5	0.0	14.3	15.8	0.0	13.1	17.1	0.0	11.7	16.5	0.0	11.4
Incr Delay (d2), s/veh	4.9	0.0	1.5	3.8	0.0	0.6	10.7	0.0	1.6	4.9	0.0	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.7	0.5	0.0	0.4	0.1	0.0	1.6	0.3	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	21.4	0.0	15.8	19.7	0.0	13.7	27.9	0.0	13.2	21.4	0.0	13.2
LnGrp LOS	C		B	B		B	C		B	C		B
Approach Vol, veh/h		142			141			315			403	
Approach Delay, s/veh		17.1			16.5			13.7			13.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.9	13.4	6.8	8.9	5.0	14.3	5.9	9.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	18.9	5.1	18.0	5.0	18.9	5.1	18.0
Max Q Clear Time (g_c+I1), s	2.6	7.2	3.2	3.9	2.2	8.3	2.6	3.4
Green Ext Time (p_c), s	0.0	1.2	0.0	0.4	0.0	1.5	0.0	0.2

Intersection Summary	
HCM 7th Control Delay, s/veh	14.7
HCM 7th LOS	B

Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	30	150	0	50	50	200	190	0	20	160	10
Future Vol, veh/h	30	30	150	0	50	50	200	190	0	20	160	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	33	163	0	54	54	217	207	0	22	174	11
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay, s/veh	11.2	10	12.2	11.3
HCM LOS	B	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	14%	0%	100%	0%
Vol Thru, %	0%	100%	14%	50%	0%	94%
Vol Right, %	0%	0%	71%	50%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	200	190	210	100	20	170
LT Vol	200	0	30	0	20	0
Through Vol	0	190	30	50	0	160
RT Vol	0	0	150	50	0	10
Lane Flow Rate	217	207	228	109	22	185
Geometry Grp	5	5	2	2	5	5
Degree of Util (X)	0.381	0.333	0.341	0.173	0.04	0.311
Departure Headway (Hd)	6.306	5.799	5.381	5.718	6.611	6.062
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	572	620	667	625	541	593
Service Time	4.042	3.535	3.427	3.772	4.356	3.806
HCM Lane V/C Ratio	0.379	0.334	0.342	0.174	0.041	0.312
HCM Control Delay, s/veh	12.9	11.4	11.2	10	9.6	11.5
HCM Lane LOS	B	B	B	A	A	B
HCM 95th-tile Q	1.8	1.5	1.5	0.6	0.1	1.3

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	240	710	10	170	440
Future Volume (vph)	10	240	710	10	170	440
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	0		0	200	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt		0.850	0.998			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3532	0	1770	3539
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1583	3532	0	1770	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		261	2			
Link Speed (mph)	30		45			45
Link Distance (ft)	415		281			280
Travel Time (s)	9.4		4.3			4.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	261	783	0	185	478
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	22.5	22.5	22.5		9.5	22.5
Total Split (s)	22.5	22.5	23.5		14.0	37.5
Total Split (%)	37.5%	37.5%	39.2%		23.3%	62.5%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	Max		None	Max
Act Effct Green (s)	7.1	7.1	19.7		8.9	33.1
Actuated g/C Ratio	0.14	0.14	0.40		0.18	0.67
v/c Ratio	0.04	0.58	0.55		0.58	0.20
Control Delay (s/veh)	17.8	8.8	13.9		27.4	3.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	17.8	8.8	13.9		27.4	3.6
LOS	B	A	B		C	A
Approach Delay (s/veh)	9.2		13.9			10.3
Approach LOS	A		B			B
Queue Length 50th (ft)	3	0	83		46	17
Queue Length 95th (ft)	13	48	154		#120	46
Internal Link Dist (ft)	335		201			200

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Turn Bay Length (ft)	100				200	
Base Capacity (vph)	648	745	1412		342	2377
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.02	0.35	0.55		0.54	0.20

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 49.2			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay (s/veh): 11.7		Intersection LOS: B	
Intersection Capacity Utilization 44.8%		ICU Level of Service A	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Street D & Prarie City Rd

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	240	710	10	170	440
Future Volume (veh/h)	10	240	710	10	170	440
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	261	772	11	185	478
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	360	320	1472	21	234	2228
Arrive On Green	0.20	0.20	0.41	0.41	0.13	0.63
Sat Flow, veh/h	1781	1585	3680	51	1781	3647
Grp Volume(v), veh/h	11	261	382	401	185	478
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1861	1781	1777
Q Serve(g_s), s	0.3	8.3	8.5	8.5	5.3	3.1
Cycle Q Clear(g_c), s	0.3	8.3	8.5	8.5	5.3	3.1
Prop In Lane	1.00	1.00		0.03	1.00	
Lane Grp Cap(c), veh/h	360	320	729	764	234	2228
V/C Ratio(X)	0.03	0.82	0.52	0.52	0.79	0.21
Avail Cap(c_a), veh/h	609	542	729	764	322	2228
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.9	20.1	11.7	11.7	22.2	4.2
Incr Delay (d2), s/veh	0.0	5.1	2.7	2.6	8.9	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	3.2	3.0	3.1	2.5	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	16.9	25.1	14.3	14.2	31.1	4.4
LnGrp LOS	B	C	B	B	C	A
Approach Vol, veh/h	272		783			663
Approach Delay, s/veh	24.8		14.3			11.9
Approach LOS	C		B			B

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.4	26.1			37.5	15.1
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	9.5	19.0			33.0	18.0
Max Q Clear Time (g_c+I1), s	7.3	10.5			5.1	10.3
Green Ext Time (p_c), s	0.1	2.8			3.0	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	15.0
HCM 7th LOS	B

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	200	10	20	170	40	10	10	50	60	10	110
Future Vol, veh/h	50	200	10	20	170	40	10	10	50	60	10	110
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	217	11	22	185	43	11	11	54	65	11	120

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	228	0	0	228	0	0	473	603	114	473	587	114
Stage 1	-	-	-	-	-	-	332	332	-	250	250	-
Stage 2	-	-	-	-	-	-	141	272	-	223	337	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1337	-	-	1337	-	-	474	411	917	474	420	917
Stage 1	-	-	-	-	-	-	656	643	-	732	699	-
Stage 2	-	-	-	-	-	-	847	683	-	759	640	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1337	-	-	1337	-	-	379	388	917	410	397	917
Mov Cap-2 Maneuver	-	-	-	-	-	-	379	388	-	410	397	-
Stage 1	-	-	-	-	-	-	629	617	-	720	687	-
Stage 2	-	-	-	-	-	-	713	672	-	673	614	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	1.5	0.67	11.2	13.51
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	656	1337	-	-	1337	-	-	617
HCM Lane V/C Ratio	0.116	0.041	-	-	0.016	-	-	0.317
HCM Control Delay (s/veh)	11.2	7.8	-	-	7.7	-	-	13.5
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	1.4

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	10	10	20	10	40	10	230	20	10	150	10
Future Vol, veh/h	20	10	10	20	10	40	10	230	20	10	150	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	11	11	22	11	43	11	250	22	11	163	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	467	484	168	473	478	261	174	0	0	272	0	0
Stage 1	190	190	-	283	283	-	-	-	-	-	-	-
Stage 2	277	293	-	190	196	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	506	483	876	502	486	778	1403	-	-	1292	-	-
Stage 1	812	743	-	724	677	-	-	-	-	-	-	-
Stage 2	729	670	-	812	739	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	459	475	876	476	478	778	1403	-	-	1292	-	-
Mov Cap-2 Maneuver	459	475	-	476	478	-	-	-	-	-	-	-
Stage 1	805	737	-	719	672	-	-	-	-	-	-	-
Stage 2	672	665	-	783	733	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	12.46	11.71	0.29	0.46
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1403	-	-	526	612	1292	-	-
HCM Lane V/C Ratio	0.008	-	-	0.083	0.124	0.008	-	-
HCM Control Delay (s/veh)	7.6	-	-	12.5	11.7	7.8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.4	0	-	-

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	20	60	10	10	50	90	30	10	310	60	30	270
Future Volume (vph)	20	60	10	10	50	90	30	10	310	60	30	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0		400		0	200		132	200	
Storage Lanes	1		0		1		0	1		0	1	
Taper Length (ft)	25				25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978				0.962			0.976			0.985
Flt Protected	0.950				0.950			0.950			0.950	
Satd. Flow (prot)	1770	1822	0	0	1770	1792	0	1770	1818	0	1770	1835
Flt Permitted	0.950							0.950			0.950	
Satd. Flow (perm)	1770	1822	0	0	1863	1792	0	1770	1818	0	1770	1835
Right Turn on Red			Yes				Yes			Yes		
Satd. Flow (RTOR)		11				26			15			9
Link Speed (mph)		40				40			40			40
Link Distance (ft)		290				615			346			357
Travel Time (s)		4.9				10.5			5.9			6.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	76	0	0	65	131	0	11	402	0	33	326
Turn Type	Prot	NA		custom	Prot	NA		Prot	NA		Prot	NA
Protected Phases	7	4			3	8		5	2		1	6
Permitted Phases				3								
Detector Phase	7	4		3	3	8		5	2		1	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	9.5	22.5		9.5	22.5		9.5	22.5
Total Split (s)	9.5	22.5		10.4	10.4	23.4		9.5	22.6		9.5	22.6
Total Split (%)	14.6%	34.6%		16.0%	16.0%	36.0%		14.6%	34.8%		14.6%	34.8%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0		1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lead	Lag		Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes
Recall Mode	None	None		None	None	None		None	Min		None	Min
Act Effct Green (s)	5.6	8.0			6.5	11.8		5.6	20.3		5.6	21.7
Actuated g/C Ratio	0.13	0.19			0.16	0.28		0.13	0.49		0.13	0.52
v/c Ratio	0.09	0.21			0.22	0.25		0.05	0.45		0.14	0.34
Control Delay (s/veh)	24.0	18.1			23.4	13.4		23.5	15.3		24.2	12.0
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0		0.0	0.0
Total Delay (s/veh)	24.0	18.1			23.4	13.4		23.5	15.3		24.2	12.0
LOS	C	B			C	B		C	B		C	B
Approach Delay (s/veh)		19.4				16.7			15.5			13.1
Approach LOS		B				B			B			B
Queue Length 50th (ft)	5	13			13	13		2	69		7	54
Queue Length 95th (ft)	26	50			53	72		17	#216		33	162
Internal Link Dist (ft)		210				535			266			277

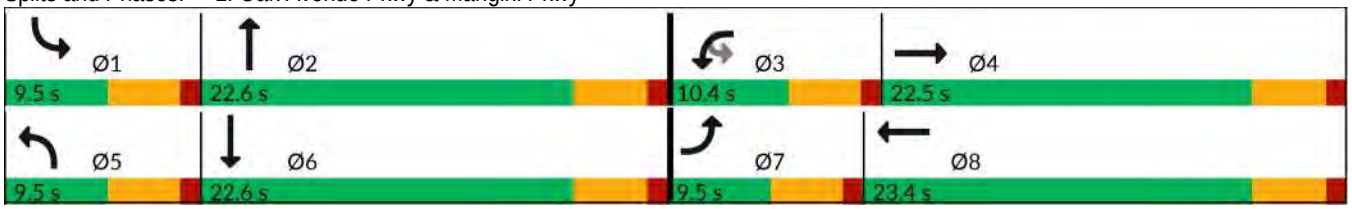
Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	30
Future Volume (vph)	30
Ideal Flow (vphpl)	1900
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	1.00
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.92
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
LOS	
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Turn Bay Length (ft)	150				400			200			200	
Base Capacity (vph)	236	880			293	916		236	1002		236	1071
Starvation Cap Reductn	0	0			0	0		0	0		0	0
Spillback Cap Reductn	0	0			0	0		0	0		0	0
Storage Cap Reductn	0	0			0	0		0	0		0	0
Reduced v/c Ratio	0.09	0.09			0.22	0.14		0.05	0.40		0.14	0.30

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 41.7			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay (s/veh): 15.3		Intersection LOS: B	
Intersection Capacity Utilization 42.4%		ICU Level of Service A	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Oak Avenue Pkwy & Mangini Pkwy



Lane Group	SBR
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	20	60	10	10	50	90	30	10	310	60	30	270
Future Volume (veh/h)	20	60	10	10	50	90	30	10	310	60	30	270
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No				No			No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870		1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	65	11		54	98	33	11	337	65	33	293
Peak Hour Factor	0.92	0.92	0.92		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	49	191	32		103	204	69	26	449	87	69	527
Arrive On Green	0.03	0.12	0.12		0.06	0.15	0.15	0.01	0.29	0.29	0.04	0.32
Sat Flow, veh/h	1781	1559	264		1781	1339	451	1781	1524	294	1781	1651
Grp Volume(v), veh/h	22	0	76		54	0	131	11	0	402	33	0
Grp Sat Flow(s),veh/h/ln	1781	0	1823		1781	0	1789	1781	0	1817	1781	0
Q Serve(g_s), s	0.5	0.0	1.4		1.1	0.0	2.5	0.2	0.0	7.4	0.7	0.0
Cycle Q Clear(g_c), s	0.5	0.0	1.4		1.1	0.0	2.5	0.2	0.0	7.4	0.7	0.0
Prop In Lane	1.00		0.14		1.00		0.25	1.00		0.16	1.00	
Lane Grp Cap(c), veh/h	49	0	223		103	0	273	26	0	536	69	0
V/C Ratio(X)	0.45	0.00	0.34		0.53	0.00	0.48	0.43	0.00	0.75	0.48	0.00
Avail Cap(c_a), veh/h	241	0	887		284	0	914	241	0	889	241	0
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00		1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.7	0.0	14.9		16.9	0.0	14.3	18.1	0.0	11.8	17.4	0.0
Incr Delay (d2), s/veh	6.4	0.0	0.9		4.1	0.0	1.3	10.8	0.0	2.1	5.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.5		0.5	0.0	0.9	0.2	0.0	2.3	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	24.1	0.0	15.8		21.1	0.0	15.6	28.9	0.0	14.0	22.4	0.0
LnGrp LOS	C		B		C		B	C		B	C	
Approach Vol, veh/h		98				185			413			359
Approach Delay, s/veh		17.6				17.2			14.4			12.3
Approach LOS		B				B			B			B

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.9	15.4	6.6	9.0	5.0	16.3	5.5	10.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	18.1	5.9	18.0	5.0	18.1	5.0	18.9
Max Q Clear Time (g_c+I1), s	2.7	9.4	3.1	3.4	2.2	7.4	2.5	4.5
Green Ext Time (p_c), s	0.0	1.5	0.0	0.2	0.0	1.3	0.0	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	14.5
HCM 7th LOS	B

Notes

User approved ignoring U-Turning movement.

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	30
Future Volume (veh/h)	30
Initial Q (Qb), veh	0
Lane Width Adj.	1.00
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1870
Adj Flow Rate, veh/h	33
Peak Hour Factor	0.92
Percent Heavy Veh, %	2
Cap, veh/h	59
Arrive On Green	0.32
Sat Flow, veh/h	186
Grp Volume(v), veh/h	326
Grp Sat Flow(s),veh/h/ln	1837
Q Serve(g_s), s	5.4
Cycle Q Clear(g_c), s	5.4
Prop In Lane	0.10
Lane Grp Cap(c), veh/h	586
V/C Ratio(X)	0.56
Avail Cap(c_a), veh/h	899
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	10.4
Incr Delay (d2), s/veh	0.8
Initial Q Delay(d3), s/veh	0.0
%ile BackOfQ(50%),veh/ln	1.6
Unsig. Movement Delay, s/veh	
LnGrp Delay(d), s/veh	11.3
LnGrp LOS	B
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	40	180	0	40	30	210	150	0	50	220	20
Future Vol, veh/h	10	40	180	0	40	30	210	150	0	50	220	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	43	196	0	43	33	228	163	0	54	239	22
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay, s/veh	11.9	10	12.5	12.7
HCM LOS	B	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	4%	0%	100%	0%
Vol Thru, %	0%	100%	17%	57%	0%	92%
Vol Right, %	0%	0%	78%	43%	0%	8%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	210	150	230	70	50	240
LT Vol	210	0	10	0	50	0
Through Vol	0	150	40	40	0	220
RT Vol	0	0	180	30	0	20
Lane Flow Rate	228	163	250	76	54	261
Geometry Grp	5	5	2	2	5	5
Degree of Util (X)	0.409	0.269	0.38	0.128	0.099	0.435
Departure Headway (Hd)	6.45	5.942	5.469	6.057	6.567	6
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	557	603	655	588	545	600
Service Time	4.198	3.69	3.523	4.129	4.318	3.75
HCM Lane V/C Ratio	0.409	0.27	0.382	0.129	0.099	0.435
HCM Control Delay, s/veh	13.6	10.9	11.9	10	10	13.3
HCM Lane LOS	B	B	B	A	A	B
HCM 95th-tile Q	2	1.1	1.8	0.4	0.3	2.2

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	220	580	10	220	600
Future Volume (vph)	10	220	580	10	220	600
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	0		0	200	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt		0.850	0.997			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3529	0	1770	3539
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1583	3529	0	1770	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		239	3			
Link Speed (mph)	30		45			45
Link Distance (ft)	415		281			280
Travel Time (s)	9.4		4.3			4.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	239	641	0	239	652
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	22.5	22.5	22.5		9.5	22.5
Total Split (s)	22.5	22.5	23.5		14.0	37.5
Total Split (%)	37.5%	37.5%	39.2%		23.3%	62.5%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	Max		None	Max
Act Effct Green (s)	7.0	7.0	19.1		9.5	33.1
Actuated g/C Ratio	0.14	0.14	0.39		0.19	0.67
v/c Ratio	0.04	0.56	0.47		0.70	0.27
Control Delay (s/veh)	17.9	8.8	12.9		33.6	3.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	17.9	8.8	12.9		33.6	3.9
LOS	B	A	B		C	A
Approach Delay (s/veh)	9.2		12.9			11.8
Approach LOS	A		B			B
Queue Length 50th (ft)	3	0	64		62	25
Queue Length 95th (ft)	13	46	121		#168	62
Internal Link Dist (ft)	335		201			200

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Turn Bay Length (ft)	100				200	
Base Capacity (vph)	649	732	1374		343	2383
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.02	0.33	0.47		0.70	0.27

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 49.1			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay (s/veh): 11.9		Intersection LOS: B	
Intersection Capacity Utilization 44.0%		ICU Level of Service A	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Street D & Prarie City Rd

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	220	580	10	220	600
Future Volume (veh/h)	10	220	580	10	220	600
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	239	630	11	239	652
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	334	298	1384	24	292	2268
Arrive On Green	0.19	0.19	0.39	0.39	0.16	0.64
Sat Flow, veh/h	1781	1585	3667	62	1781	3647
Grp Volume(v), veh/h	11	239	313	328	239	652
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1859	1781	1777
Q Serve(g_s), s	0.3	7.5	6.8	6.8	6.7	4.2
Cycle Q Clear(g_c), s	0.3	7.5	6.8	6.8	6.7	4.2
Prop In Lane	1.00	1.00		0.03	1.00	
Lane Grp Cap(c), veh/h	334	298	688	720	292	2268
V/C Ratio(X)	0.03	0.80	0.46	0.46	0.82	0.29
Avail Cap(c_a), veh/h	620	552	688	720	327	2268
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.2	20.1	11.8	11.8	20.9	4.1
Incr Delay (d2), s/veh	0.0	5.0	2.2	2.1	13.7	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	2.9	2.4	2.5	3.4	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	17.2	25.1	13.9	13.9	34.6	4.5
LnGrp LOS	B	C	B	B	C	A
Approach Vol, veh/h	250		641			891
Approach Delay, s/veh	24.8		13.9			12.6
Approach LOS	C		B			B

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	13.0	24.5			37.5	14.2
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	9.5	19.0			33.0	18.0
Max Q Clear Time (g_c+I1), s	8.7	8.8			6.2	9.5
Green Ext Time (p_c), s	0.1	2.5			4.2	0.5

Intersection Summary			
HCM 7th Control Delay, s/veh		14.8	
HCM 7th LOS		B	

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	100	200	20	50	180	70	10	10	30	50	10	70
Future Vol, veh/h	100	200	20	50	180	70	10	10	30	50	10	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	109	217	22	54	196	76	11	11	33	54	11	76

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	272	0	0	239	0	0	658	826	120	674	799	136
Stage 1	-	-	-	-	-	-	446	446	-	342	342	-
Stage 2	-	-	-	-	-	-	212	380	-	332	457	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1289	-	-	1325	-	-	350	306	909	340	317	888
Stage 1	-	-	-	-	-	-	561	573	-	646	636	-
Stage 2	-	-	-	-	-	-	770	612	-	656	566	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1289	-	-	1325	-	-	271	268	909	278	278	888
Mov Cap-2 Maneuver	-	-	-	-	-	-	271	268	-	278	278	-
Stage 1	-	-	-	-	-	-	514	524	-	620	610	-
Stage 2	-	-	-	-	-	-	664	587	-	567	518	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	2.52	1.31	13.73	16.96
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	467	1289	-	-	1325	-	-	441
HCM Lane V/C Ratio	0.116	0.084	-	-	0.041	-	-	0.32
HCM Control Delay (s/veh)	13.7	8.1	-	-	7.8	-	-	17
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0.3	-	-	0.1	-	-	1.4

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	10	10	20	10	30	10	150	20	40	260	20
Future Vol, veh/h	10	10	10	20	10	30	10	150	20	40	260	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	11	11	22	11	33	11	163	22	43	283	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	571	587	293	571	587	174	304	0	0	185	0	0
Stage 1	380	380	-	196	196	-	-	-	-	-	-	-
Stage 2	190	207	-	375	391	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	432	422	746	432	422	870	1256	-	-	1390	-	-
Stage 1	642	614	-	806	739	-	-	-	-	-	-	-
Stage 2	812	731	-	646	607	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	389	405	746	398	405	870	1256	-	-	1390	-	-
Mov Cap-2 Maneuver	389	405	-	398	405	-	-	-	-	-	-	-
Stage 1	622	594	-	799	732	-	-	-	-	-	-	-
Stage 2	763	725	-	605	588	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	13.23	12.45	0.44	0.96
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1256	-	-	470	548	1390	-	-
HCM Lane V/C Ratio	0.009	-	-	0.069	0.119	0.031	-	-
HCM Control Delay (s/veh)	7.9	-	-	13.2	12.4	7.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.4	0.1	-	-

Attachment C

Intersection Control Evaluation (ICE) Memorandum

INTERSECTION CONTROL EVALUATION

TOLL BROTHERS AT ALDER CREEK

FOLSOM, CALIFORNIA

Prepared for:
Toll Brothers, Inc.
110 Woodmere Rd., Suite 120
Folsom, CA 95630

Prepared by:
Kimley»Horn

March 2025
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INTERSECTION CONTROL EVALUATION
FOR

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Intersection Control Evaluation
Toll Brothers at Alder Creek in Folsom, CA

EXECUTIVE SUMMARY

The purpose of conducting an Intersection Control Evaluation (ICE) is to provide a holistic decision-making process and framework to evaluate intersection control alternatives using a performance-based approach to engineering and investment decisions. According to the Federal Highway Administration (FHWA)[1], an Intersection Control Evaluation (ICE) is a data-driven, performance-based framework and approach used to objectively screen alternatives and identify an optimal geometric and control solution for an intersection. This document will provide:

- An objective assessment and evaluation of traffic control options
- A data driven engineering analysis of intersection Operations and Safety
- A qualitative analysis of location benefits and restrictions
- A benefit-cost comparison of intersection control alternatives

GOALS AND OBJECTIVES

The City of Folsom ("City") has developed and adopted "Roundabout First" policy language[2]. As part of this policy, the City is also developing roundabout design standards intended to inform the infrastructure build-out of key areas within the City, including developing areas of the Folsom Plan Area Specific Plan[3]. As such, the City requests the analysis of concept level, feasible intersection control alternatives using Intersection Control Evaluation (ICE) format. The purpose of this evaluation is to provide an objective analysis that allows the Client and the City to make a traffic control investment decision based on an operations strategy for the design life of the intersection. Overall, the purpose of the Toll Brothers at Alder Creek Intersection Control Evaluation is to:

- Provide consistent documentation that improves transparency of transportation investment decisions
- Implementation of safer, more balanced, and cost-effective solutions
- Emphasize the use of objective performance measures for consistent comparisons
- Assess the benefit-cost of making intersection control improvements at high priority intersections
- Prioritize intersection improvements based on calculated benefit-cost ratio

[1] *Intersection Control Evaluation*, United States Department of Transportation Federal Highway Administration, February 2025.
[2] *Roundabout Feasibility Study Findings*, Folsom City Council Meeting, February 25, 2025.
[3] Section 7 Circulation, *Folsom Plan Area Specific Plan*, City of Folsom, April 2024.

ICE STUDY METHODOLOGIES

The following is a summary of the ICE study methodologies used in this report, consistent with Caltrans guidelines. Four key quantitative performance measures were used to determine the benefits of proposed improvements:

Delay Reduction Benefit: The delay reduction benefit is a measure of the societal cost associated with the number of person-hours of delay at the study intersection during the study period. Components used to calculate the delay reduction benefit include peak hour delay, average vehicle occupancy (AVO), and the value of travel time savings (VTTS).

Safety Benefit: The safety benefit is a measure of the societal cost associated with the predicted number and severity of crashes that may occur based on intersection control type, intersection configuration, physical setting, and volume of traffic.

Operations and Maintenance Costs: The operations and maintenance (O&M) cost is a measure of the added annual cost to operate and maintain the proposed intersection control alternative. These costs include annual power consumption for lighting, signal power consumption, traffic signal timing, equipment replacement, pavement management, and landscape maintenance amongst others.

Initial Capital Costs: The initial capital cost is a measure of the added cost to construct the proposed improvements. A range of estimated order of magnitude costs was developed for the proposed improvements based on engineering judgement.

A Benefit-Cost (B/C) ratio was developed using the quantitative performance measures described above. The B/C ratio measures the expected return on investment when a traditionally controlled intersection (stop-controlled and/or traffic signal) is compared relative to a proposed roundabout controlled intersection. If only one alternative has a positive B/C, it will be the preferred alternative. If no proposed alternatives generate a B/C greater than one, then the existing control will be the preferred alternative. Level two screening compares the two proposed alternatives. The alternative with the greatest benefit compared to the cost will be the preferred alternative.

In addition to the key performance measures mentioned above, consideration is also given to qualitative measures. Some of these measures include presence and width of sidewalks, presence and class of bike lanes, and required right-of-way acquisition. For each scenario, existing site constraints have been considered to determine feasible improvements that will provide operational and safety benefits.

STUDY INTERSECTION OVERVIEW

Intersection Control Alternative Summary

Three (3) intersections were evaluated in this Intersection Control Evaluation (ICE) Study Report which are identified in **Table 1**. To assess the benefit-cost relationship of different intersection controls, two alternative controls were evaluated at each intersection. The legend (right) displays the symbols used throughout this report to represent the proposed control types. **Table 1** provides a summary of the alternatives evaluated and the resulting recommendations for each intersection.

Legend	
Control Type	Proposed
Stop-Controlled	
Traffic Signal	
Roundabout	

Table 1: Intersection Control Alternative Summary

Intersection Control Alternative Summary				
Intersection		Evaluated Alternatives		Recommendation
		Option A	Option B	
INT 1	Oak Avenue Pkwy and Mangini Pkwy			
INT 2	Oak Avenue Pkwy and Street D			
INT 3	Prairie City Rd and Street D			

INTERSECTION OPERATIONS METHODOLOGY

Existing traffic operations were analyzed for the study intersections' AM and PM peak hour conditions. Turning movement counts (TMCs), peak hour factors, and heavy vehicle percentages obtained during data collection were utilized in analyzing each intersection. For intersections, level of service (LOS) is determined based on the seconds of control delay per vehicle. The City of Folsom's target intersection LOS is LOS D[4].

Table 2 summarizes the LOS criteria for signalized and unsignalized intersections. Roundabout delay and LOS follow the standards for unsignalized intersections.

Table 2: LOS Criteria for Signalized and Unsignalized Intersections

Signalized Intersection Average Control Delay per Vehicle (sec)	Unsignalized Intersection Average Control Delay per Vehicle (sec)	LOS
≤ 10	≤ 10	A
> 10 and ≤ 20	> 10 and ≤ 15	B
> 20 and ≤ 35	> 15 and ≤ 25	C
> 35 and ≤ 55	> 25 and ≤ 35	D
> 55 and ≤ 80	> 35 and ≤ 50	E
> 80 or if V/C ≥ 1.0	> 50 or if V/C ≥ 1.0	F
Note: For approach-based and intersection-wide assessments, LOS is defined solely by control delay. Source: *Highway Capacity Manual, 7th Edition*		

[4] Chapter 3, *Folsom General Plan 2035*, City of Folsom, August 27, 2024.

PEDESTRIAN SAFETY

Pedestrian safety is significantly enhanced by several key factors.

Lower traffic speeds reduce the likelihood and severity of collisions. When vehicles travel at slower speeds, drivers have more time to react to unexpected events, and any collisions that do occur are less likely to result in severe injuries or fatalities. For instance, a pedestrian hit by a vehicle traveling at 20 mph has approximately 90% chance of survival, compared to less than 20% at 40 mph[5].

Fewer vehicle-pedestrian conflict points also contribute to enhanced safety. Each crosswalk at an intersection has several potential conflict points where pedestrians and vehicles intersect. Vehicles traveling through the intersection and turning left or right create conflict points with pedestrians crossing the street. Right turns are particularly hazardous because drivers must look in the opposite direction for oncoming traffic and may miss seeing pedestrians. Intersections like roundabouts reduce the number of lanes and eliminate separate turning movements, thus reducing the number of conflict points compared to traditional intersections and subsequently reducing the chances of collisions.

The single lane roundabout provides the fewest number of pedestrian conflict points (2 times less than the multi-lane roundabout and 4 times less than the AWSC or signal) for the considered alternatives.

Shorter crossing distances minimize the time pedestrians are exposed to traffic, reducing the risk of collisions. Features like curb extensions and pedestrian islands help shorten crossing distances, making it safer and easier for pedestrians to cross streets. For the roundabout alternatives, pedestrians only need to cross 1-2 lanes at a time, with a refuge island in the middle. This reduces the crossing distance and minimizes the crossing time. The all-way stop, HAWK, and signal alternatives maintain larger crossing distances spanning multiple lanes and a median.

The single lane roundabout provides the shortest crossing time (less than half of 2-lane roundabout and nearly 7 times less than HAWK or signal) for the considered alternatives.

Table 3 below summarizes the crossing time, number of conflict points, and vehicle speeds at the crosswalk for each of the intersection control alternatives.

Table 3: Pedestrian Safety Assessment

Alternative	Average Crossing Time (s)	Number of Conflict Points	Estimated Vehicle Speed at Crosswalk (mph)
Single Lane Roundabout	36	8	23
All-way Stop (4 Lane)	150 - 240	32	5
Multi Lane Roundabout	72	16	27
Traffic Signal (2 Lane)	144 - 156	32	30 - 45
Traffic Signal (4 Lane)	156 - 252	32	30 - 45

[5] Chapter 5. Risk Factors Other than Exposure, *Synthesis of Methods for Estimating Pedestrian and Bicyclist Exposure to Risk at Areawide Levels and on Specific Transportation Facilities*, United States Department of Transportation Federal Highway Administration, January 2017.

INTERSECTION 1 – OAK AVENUE PARKWAY AND MANGINI PARKWAY

Intersection Control Alternatives

The current existing intersection only consists of the south and east legs. The evaluation assumes the build out of the north and west legs and transitions from divided two-lane road segments along Oak Avenue Parkway and Mangini Parkway.

The two intersection control types analyzed include:

1. Traffic Signal
2. Single-lane Roundabout

Figure 1 presents the concept lane configuration and geometry of the traffic signal alternative. **Figure 2** presents the concept lane configuration and geometry of the roundabout alternative.

The concept layouts are also included in **Appendix A**.

Figure 1: Intersection 1 Traffic Signal Alternative Concept

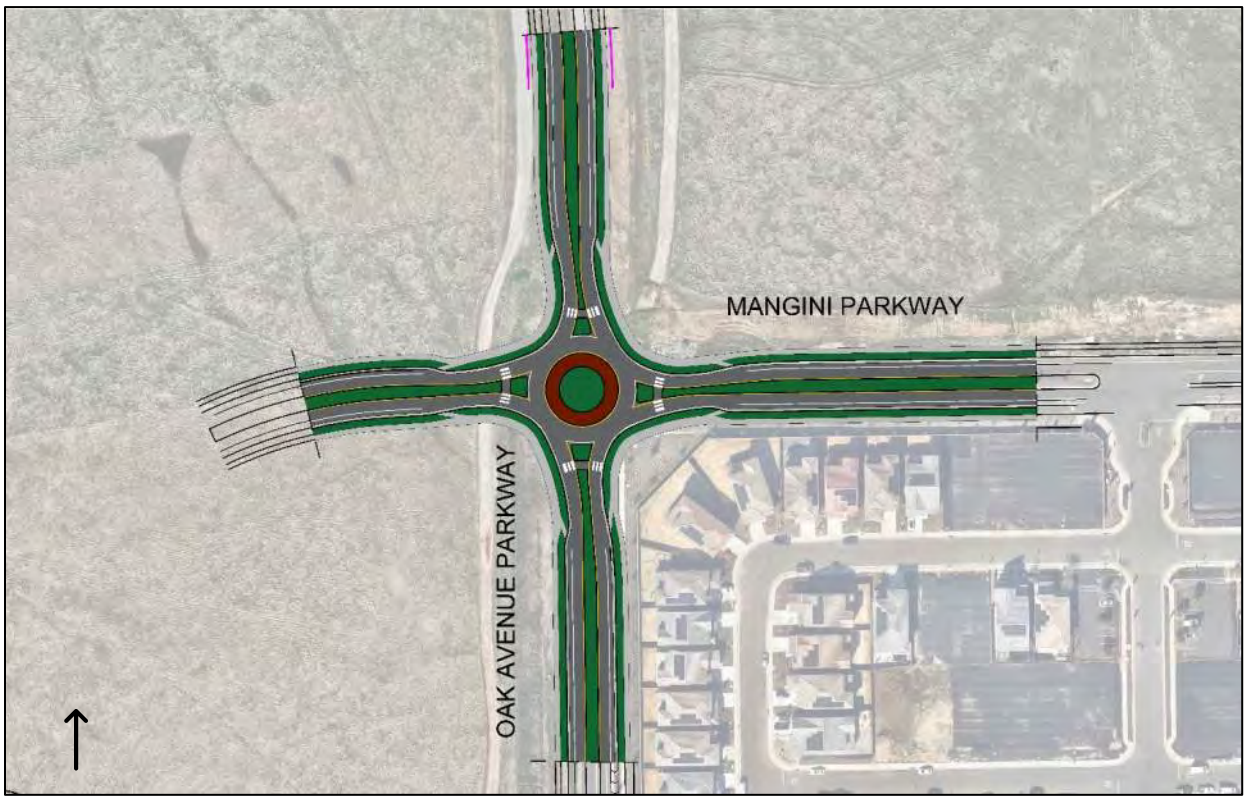


Figure 2: Intersection 1 Roundabout Alternative Concept

Qualitative Assessment

Table 4 summarizes qualitative factors that were considered in the design of each alternative.

Table 4: Intersection 1 Qualitative Analysis

Qualitative Assessment		Traffic Signal Feasibility	Roundabout Control Feasibility
INT 1	**Oak Avenue Parkway and Mangini Parkway**		
	Urban Environment Focus	N/A	N/A
	Design for Pedestrians	✓	✓
	Design for Bicyclists	✓	✓
	Slow Traffic Speeds to Benefit Local Businesses	N/A	N/A
	Minimize ROW Acquisition to Limit Initial Costs	✓	✓
	Minimize Left-Turn Movements to Improve Safety	✗	✓
Feasible	✓		
Not Feasible	✗		

Operations Summary

Table 5 summarizes the traffic operations at Intersection 1. The Synchro® and SIDRA® reports for the analysis can be found in Appendix B and Appendix C.

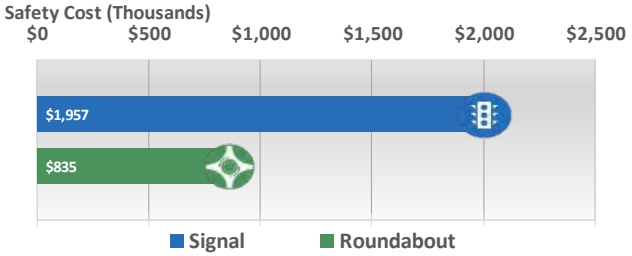
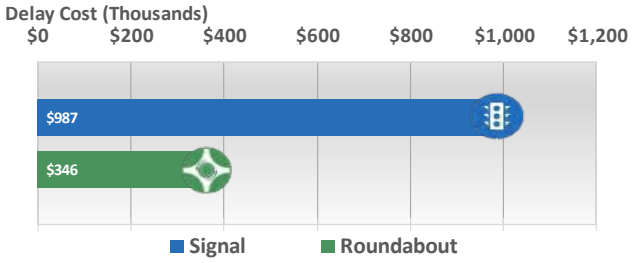
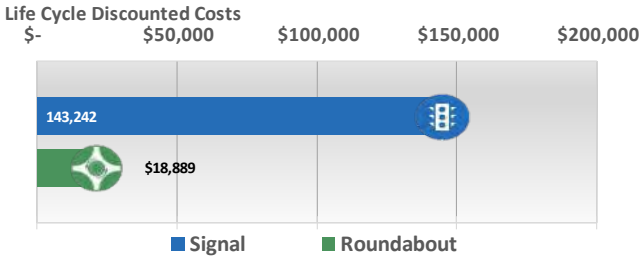
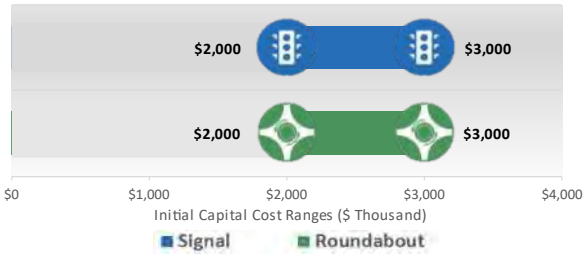
Table 5: Intersection 1 Operations Summary

Control Type	Year	Period	Delay	LOS	Queue		v/c
					Length (ft)	Approach	
Signal	2025	AM	16.2	B	120	SB	-
		PM	15.6	B	103	SB	-
	2045	AM	14.7	B	184	SB	-
		PM	14.4	B	205	NB	-
Roundabout	2025	AM	3.9	A	25	SB	0.175
		PM	4.2	A	25	WB	0.203
	2045	AM	5.8	A	50	SB	0.337
		PM	6.1	A	55	NB	0.350

Performance Measure Summary

Four performance measures were evaluated at each intersection for signal and roundabout control. **Table 6** below summarizes the performance measures considered for Intersection 1.

Table 6: Intersection 1 Performance Measure Summary

Performance Measure	Preferred Alt.	Visual Representation
Benefits		
Safety Safety measures the societal cost associated with the predicted number and severity and collisions. Overall societal costs are based on Caltrans Vehicle Operation Cost Parameters. Injury and Fatality crashes are on average 700-1,000 times more expensive than Property Damage Only accidents. Further details can be found in **Appendix D**.		
Delay Delay measures the societal cost associated with the number of person-hours delayed in traffic. Overall societal costs are based on Caltrans Vehicle Operation Cost Parameters.		
Costs		
Operations and Maintenance O&M measures the common annualized costs associated with operating and maintaining the intersection.		
Initial Capital Cost Measures the Initial Capital Costs (ICC) needed to plan, design, obtain project approvals, acquire right-of-way, and construct the intersection control. This graph (right) depicts the estimated range of Initial capital costs for the signal and roundabout alternatives.		

Intersection Life Cycle Cost Calculations

Table 7 summarizes the net present value of each of the four different performance measures as well as the lifecycle benefit-cost ratio when comparing the roundabout to the signal.

Table 7: Intersection 1 B/C Analysis of Alternatives

PERFORMANCE MEASURE LIFE CYCLE COST (NET PRESENT VALUE)		
Safety		
	Signal	**Roundabout**
Annual Cost of Collisions	$127,143	$54,401
Discounted Life Cycle Cost of Collisions	$1,956,639	$835,379
Delay		
	Signal	**Roundabout**
Annual Quantity (hours)	2306	825
Annual Cost	$46,989	$16,454
Total Discounted Life Cycle Cost	$986,768	$345,527
Operations and Maintenance		
	Signal	**Roundabout**
Annual O&M Costs	$9,100	$1,200
Discounted Life Cycle O&M Costs	$143,242	$18,889
Discounted Pavement Rehab Costs	$0	$0
Total O&M Costs	$143,242	$18,889
Initial Capital		
	Signal	**Roundabout**
High Approximation	$3,000,000	$3,000,000
Low Approximation	$2,000,000	$2,000,000
Average	**$2,500,000**	**$2,500,000**
LIFE CYCLE BENEFIT COST RATIO		
Total Benefits (B)		
Added Benefits Compared to Signal	**Signal**	**Roundabout**
Safety	$-	$1,121,261
Delay	$-	$641,241
Total Benefits	**$-**	**$1,762,501**
Total Costs (C)		
Added Cost Compared to Signal	**Signal**	**Roundabout**
O&M	$-	$(124,353)
Initial Capital	$-	$-
Total Costs	**$0**	**$(124,353)**
B/C Ratio Compared to Signal	**N/A**	**-14.17**

The preferred control based on the B/C analysis is the roundabout. The B/C ratio is negative as the roundabout alternative has both more benefits and less cost when compared to the signal.

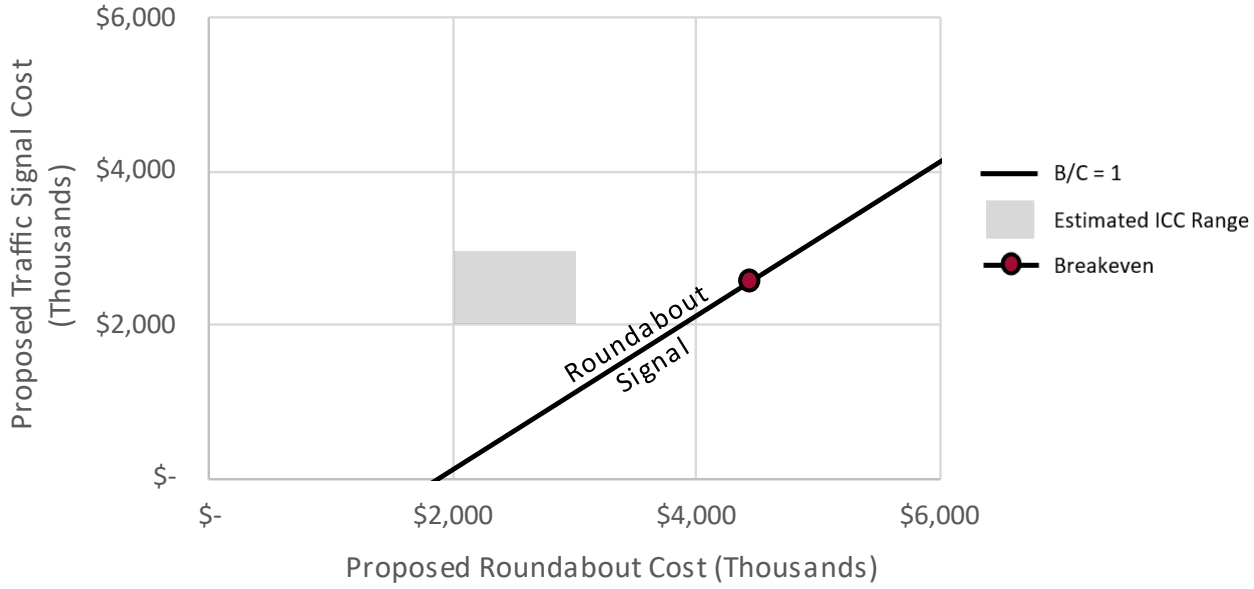
Table 8 below summarizes the B/C ratio calculations for comparing the roundabout to the signal alternative.

Table 8: Alternative Traffic Control Benefit-Cost Ratio Calculations

Benefit-Cost Ratio Calculations for Signal (A) vs Roundabout (B)							
	Initial Capital Cost			Project Constants			
B/C Target	Signal (A)	Roundabout (B)	Added Cost (C)=(B-A)	Added O&M Cost for Roundabout (D)	Total Benefits (E)	Total Costs (F)=(C+D)	B/C (G)=(E/F)
High	$ 3,000,000	$ 2,000,000	$ (1,000,000)			$ (1,124,353)	Roundabout Preferred
Low	$ 2,000,000	$ 3,000,000	$ 1,000,000	$ (124,353)	$ 1,762,501	$ 875,647	2.01
Breakeven	$ 2,500,000	$ 4,386,854	$ 1,886,854			$ 1,762,501	1.00

The high B/C target is calculated assuming the high-end of the traffic signal initial capital costs and the low-end of the roundabout initial capital costs.

The low B/C target is calculated assuming the low-end of the traffic signal initial capital costs and the high-end of the roundabout initial capital costs.



B/C Analysis Summary at Intersection 1

The table above summarizes the B/C analysis for Oak Avenue Parkway and Mangini Parkway. The initial capital cost (ICC) ranges for the roundabout and signal options are represented by the grey box area. The black diagonal line represents a neutral B/C ratio of 1.0. If a pair of roundabout and signal ICC costs (x and y values) are above the black diagonal line, then the B/C ratio is greater than 1.0 and the roundabout option has the greater return on investment (ROI). If a pair of roundabout and signal ICC costs is below the black diagonal line, then the B/C ratio is less than 1.0 and the signal has the greater ROI. The roundabout budget is depicted with the circle symbol and represents how much can be spent on the roundabout ICC to achieve a neutral B/C equal to 1.0.

INTERSECTION 2 – OAK AVENUE PARKWAY AND STREET D

Intersection Control Alternatives

Oak Avenue Parkway and Street D is planned to be constructed with the construction of the Toll Brothers at Alder Creek property. The evaluation assumes transitions from divided two-lane road segments along Oak Avenue Parkway and Street D.

The three intersection control types analyzed include:

1. All-Way Stop Control
2. Single-lane Roundabout

Figure 3 presents the concept lane configuration and geometry of the AWSC alternative. **Figure 4** presents the concept lane configuration and geometry of the roundabout alternative.

The concept layouts are also included in **Appendix A**.

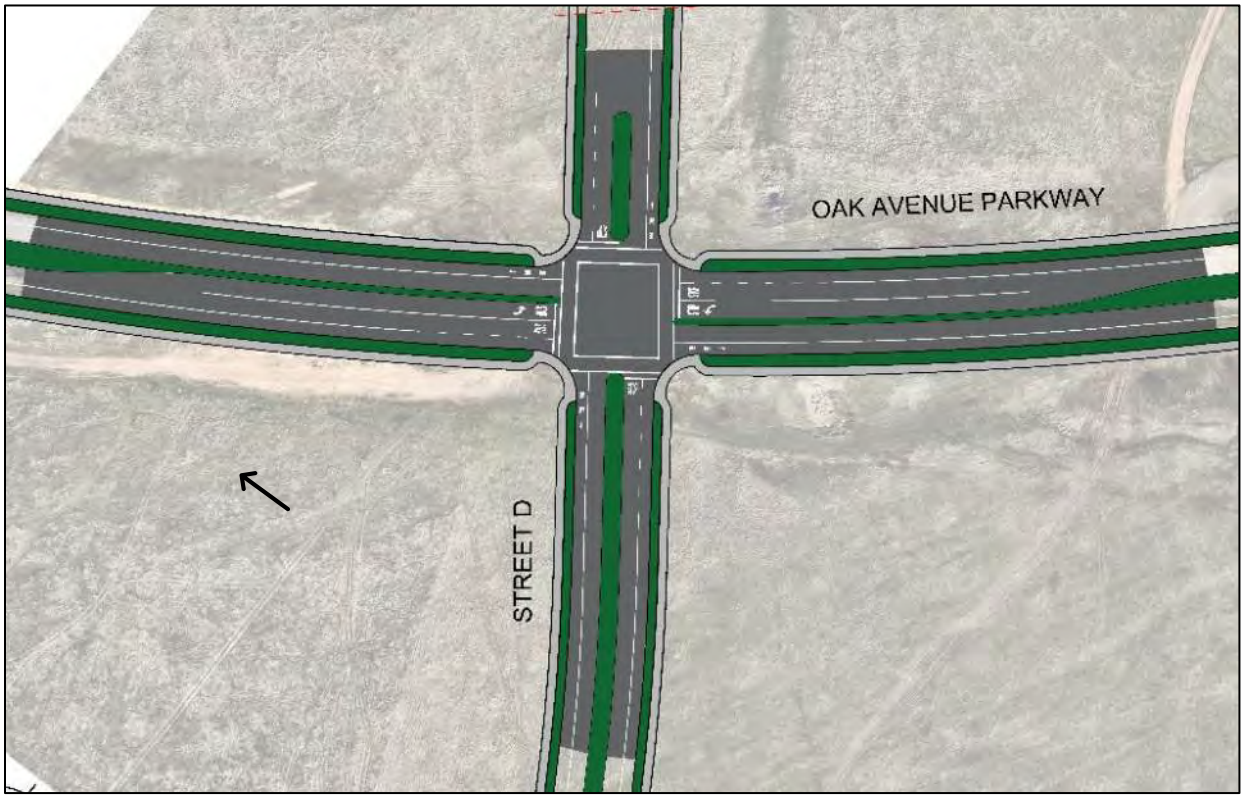


Figure 3: Intersection 2 Traffic Signal Alternative Concept

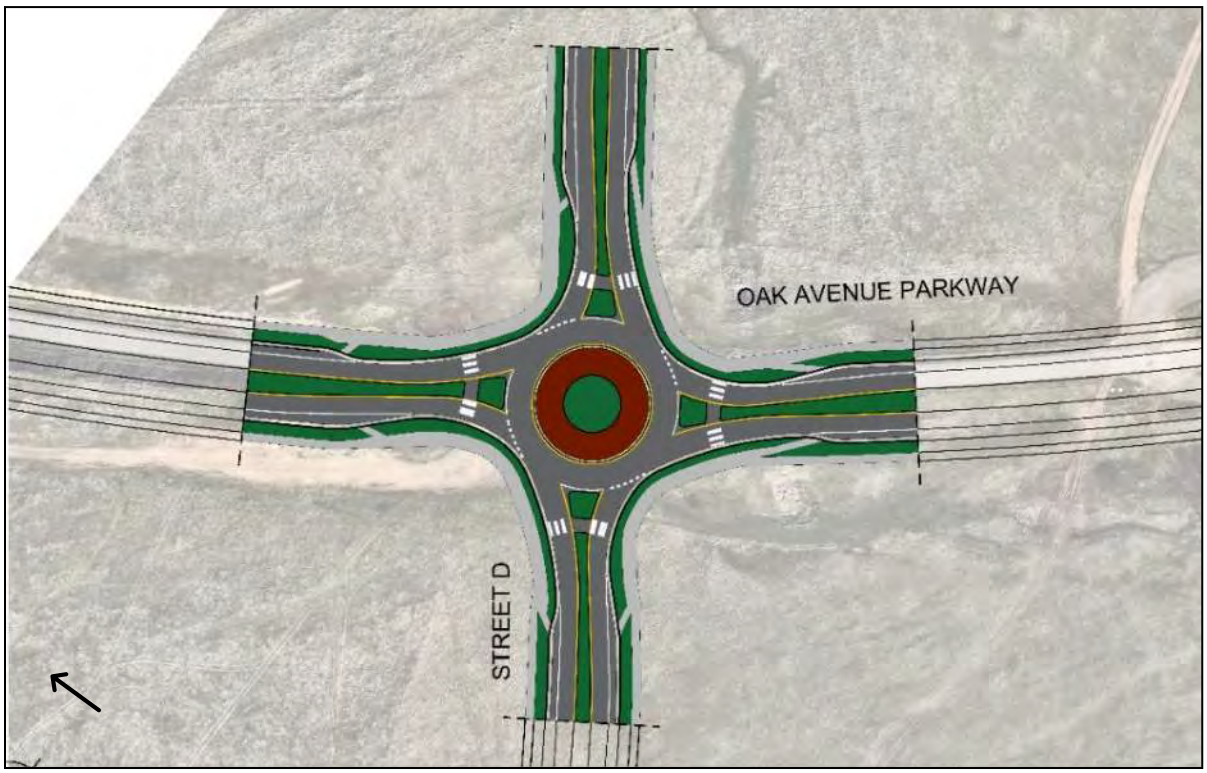


Figure 4: Intersection 2 Roundabout Alternative Concept

Qualitative Assessment

Table 9 summarizes qualitative factors that were considered in the design of each alternative.

Table 9: Intersection 2 Qualitative Assessment

Qualitative Assessment		AWSC Control Feasibility	Traffic Signal Feasibility	Roundabout Control Feasibility
INT 2	**Oak Avenue Parkway and Street D**			
	Urban Environment Focus	N/A	N/A	N/A
	Design for Pedestrians	✓	✓	✓
	Design for Bicyclists	✓	✓	✓
	Slow Traffic Speeds to Benefit Local Businesses	N/A	N/A	N/A
	Minimize ROW Acquisition to Limit Initial Costs	✓	✓	✓
	Minimize Left-Turn Movements to Improve Safety	✗	✗	✓
Feasible	✓			
Not Feasible	✗			

Operations Summary

Table 10 summarizes the traffic operations at Intersection 2. The Synchro® and SIDRA® reports for the analysis can be found in Appendix B and Appendix C.

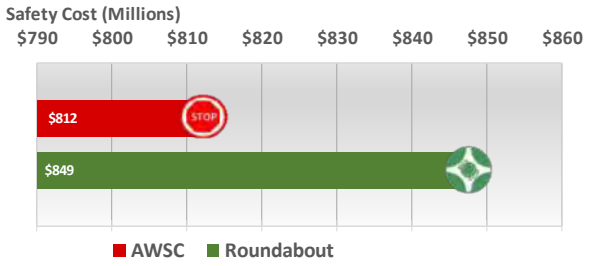
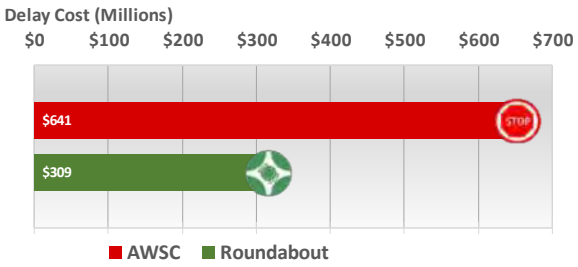
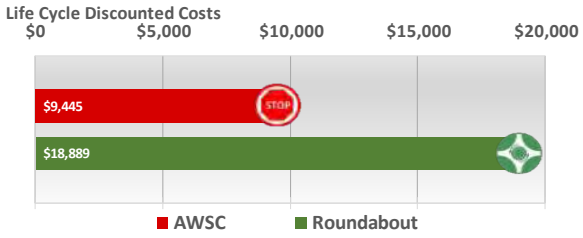
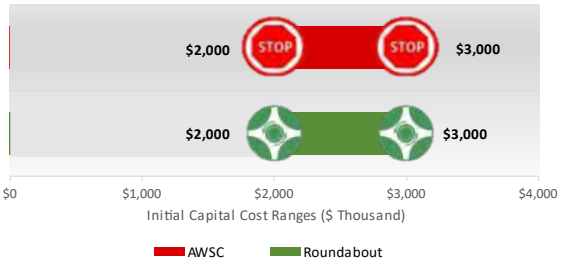
Table 10: Intersection 2 Operations Summary

Control Type	Year	Period	Delay	LOS	Queue		v/c
					Length (ft)	Approach	
AWSC	2025	AM	8.4	A	20	NB	-
		PM	8.5	A	25	EB	-
	2045	AM	11.5	B	45	NB	-
		PM	12.2	B	55	SB	-
Roundabout	2025	AM	3.6	A	15	NB	0.112
		PM	3.9	A	20	NB	0.153
	2045	AM	5.6	A	55	NB	0.344
		PM	6.1	A	50	NB	0.325

Performance Measure Summary

Four performance measures were evaluated at each intersection for signal and roundabout control. **Table 11** below summarizes the performance measures considered in this study.

Table 31: Intersection 2 Performance Measure Summary

Performance Measure	Preferred Alt.	Visual Representation
Benefits		
Safety Safety measures the societal cost associated with the predicted number and severity and collisions. Overall societal costs are based on Caltrans Vehicle Operation Cost Parameters. Injury and Fatality crashes are on average 700-1,000 times more expensive than Property Damage Only accidents. Further details can be found in **Appendix D**.	STOP	
Delay Delay measures the societal cost associated with the number of person-hours delayed in traffic. Overall societal costs are based on Caltrans Vehicle Operation Cost Parameters.		
Costs		
Operations and Maintenance O&M measures the common annualized costs associated with operating and maintaining the intersection.	STOP	
Initial Capital Cost Measures the Initial Capital Costs (ICC) needed to plan, design, obtain project approvals, acquire right-of-way, and construct the intersection control. This graph (right) depicts the estimated range of Initial capital costs for the signal and roundabout alternatives.	STOP	

Intersection Life Cycle Cost Calculations

Table 12 summarizes the net present value of each of the four different performance measures as well as the lifecycle benefit-cost ratio when comparing the roundabout to the AWSC.

Table 4: Intersection 2 B/C Analysis of Alternatives

PERFORMANCE MEASURE LIFE CYCLE COST (NET PRESENT VALUE)		
Safety		
	AWSC	**Roundabout**
Annual Cost of Collisions	$53,682	$56,159
Discounted Life Cycle Cost of Collisions	$811,848	$848,573
Delay		
	AWSC	**Roundabout**
Annual Quantity (hours)	1542	745
Annual Cost	$30,568	$14,701
Total Discounted Life Cycle Cost	$641,938	$308,731
Operations and Maintenance		
	AWSC	**Roundabout**
Annual O&M Costs	$600	$1,200
Discounted Life Cycle O&M Costs	$9,445	$18,889
Discounted Pavement Rehab Costs	$0	$0
Total O&M Costs	$9,445	$18,889
Initial Capital		
	AWSC	**Roundabout**
High Approximation	$3,000,000	$3,000,000
Low Approximation	$2,000,000	$2,000,000
Average	**$2,500,000**	**$2,500,000**
LIFE CYCLE BENEFIT-COST RATIO		
Total Benefits (B)		
Added Benefits Compared to AWSC	**AWSC**	**Roundabout**
Safety	$0	-$36,725
Delay	$0	$333,207
Total Benefits	**$0**	**$296,482**
Total Costs (C)		
Added Cost Compared to Existing Conditions	**AWSC**	**Roundabout**
O&M	$0	$9,445
Initial Capital	$0	$0
Total Costs	**$0**	**$9,445**
B/C Ratio Compared to Existing Conditions	**N/A**	**31.39**

The preferred control based on the B/C analysis is the roundabout.

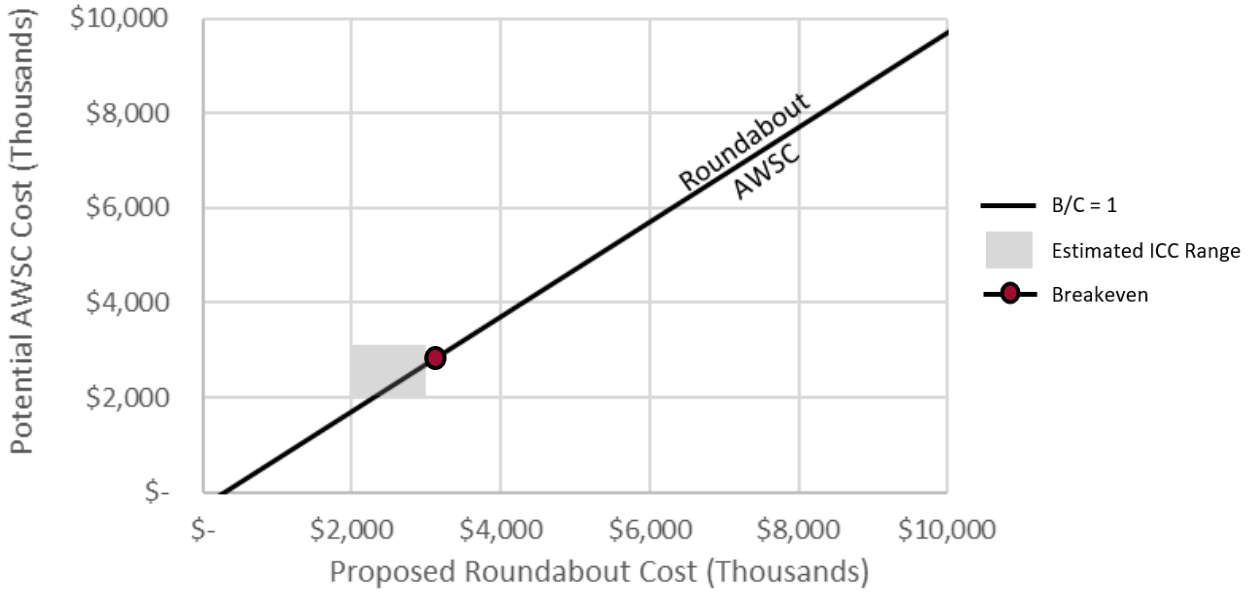
Table 13 below summarizes the B/C ratio calculations for comparing the roundabout to the AWSC alternative.

Table 5: Alternative Traffic Control Benefit-Cost Ratio Calculations

Benefit-Cost Ratio Calculations for AWSC (A) vs Roundabout (B)							
	Initial Capital Cost			Project Constants			
B/C Target	AWSC (A)	Roundabout (B)	Added Cost (C)=(B-A)	Added O&M Cost for Roundabout (D)	Total Benefits (E)	Total Costs (F)=(C+D)	B/C (G)=(E/F)
High	$ 3,000,000	$ 2,000,000	$ (1,000,000)			$ (990,555)	Roundabout Preferred
Low	$ 2,000,000	$ 3,000,000	$ 1,000,000	$ 9,445	$ 296,482	$ 1,009,445	0.29
Breakeven	$ 2,500,000	$ 2,787,038	$ 287,038			$ 296,482	1.00

The high B/C target is calculated assuming the high-end of the traffic signal initial capital costs and the low-end of the roundabout initial capital costs.

The low B/C target is calculated assuming the low-end of the traffic signal initial capital costs and the high-end of the roundabout initial capital costs.



B/C Analysis Summary at Intersection 2

The table above summarizes the B/C analysis for Oak Avenue Parkway and Mangini Parkway. The initial capital cost (ICC) ranges for the roundabout and AWSC options are represented by the grey box area. The black diagonal line represents a neutral B/C ratio of 1.0. If a pair of roundabout and signal ICC costs (x and y values) are above the black diagonal line, then the B/C ratio is greater than 1.0 and the roundabout option has the greater return on investment (ROI). If a pair of roundabout and signal ICC costs is below the black diagonal line, then the B/C ratio is less than 1.0 and the signal has the greater ROI. The roundabout budget is depicted with the circle symbol and represents how much can be spent on the roundabout ICC to achieve a neutral B/C equal to 1.0.

INTERSECTION 3 – PRAIRIE CITY ROAD AND STREET D

Intersection Control Alternatives

Prairie City Road and Street D is planned to be constructed with the construction of the Toll Brothers at Alder Creek property. The evaluation assumes transitions from divided two-lane road segments along Street D and divided four-lane road segments along Prairie City Road.

The two intersection control types analyzed include:

1. Traffic Signal
2. Multi-lane Roundabout

Figure 5 presents the concept lane configuration and geometry of the traffic signal alternative. Figure 6 presents the concept lane configuration and geometry of the roundabout alternative.

The concept layouts are also included in Appendix A.

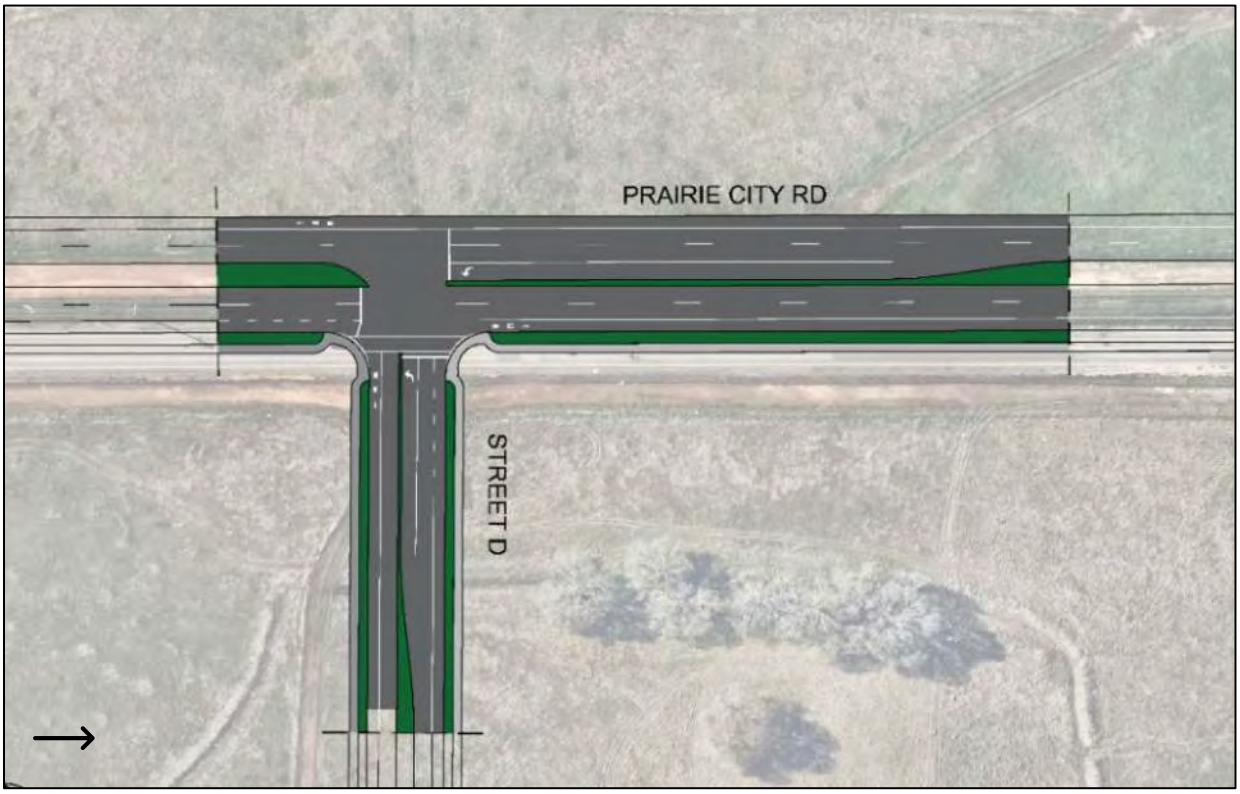


Figure 6: Intersection 3 Traffic Signal Alternative Concept

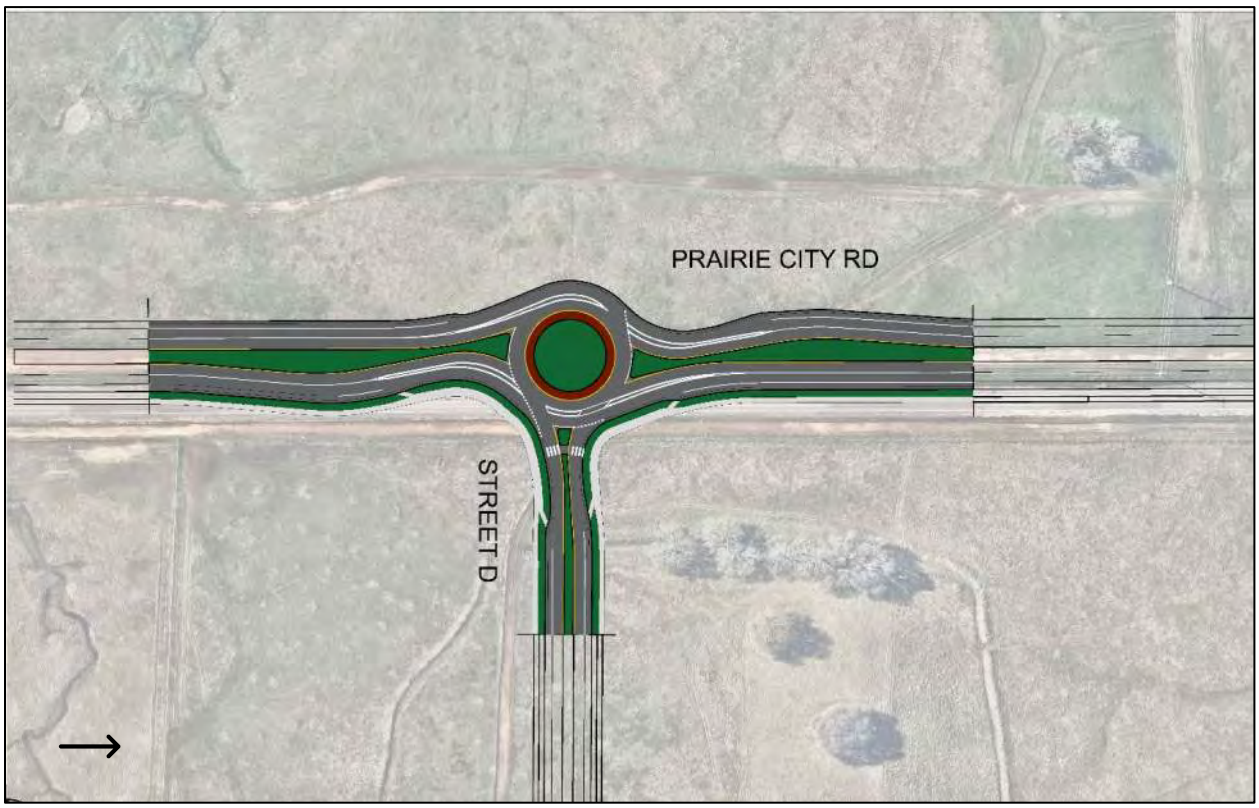


Figure 7: Intersection 3 Roundabout Alternative Concept

Qualitative Assessment

Table 14 summarizes qualitative factors that were considered in the design of each alternative.

Table 14: Intersection 3 Qualitative Assessment

Qualitative Assessment		Traffic Signal Feasibility	Roundabout Control Feasibility
INT 3	**Prairie City Road and Street D**		
	Urban Environment Focus	N/A	N/A
	Design for Pedestrians	✓	✓
	Design for Bicyclists	✓	✓
	Slow Traffic Speeds to Benefit Local Businesses	N/A	N/A
	Minimize ROW Acquisition to Limit Initial Costs	✓	✓
	Minimize Left-Turn Movements to Improve Safety	✗	✓
Feasible	✓		
Not Feasible	✗		

Operations Summary

Table 15 summarizes the traffic operations at Intersection 2. The Synchro® and SIDRA® reports for the analysis can be found in Appendix B and Appendix C.

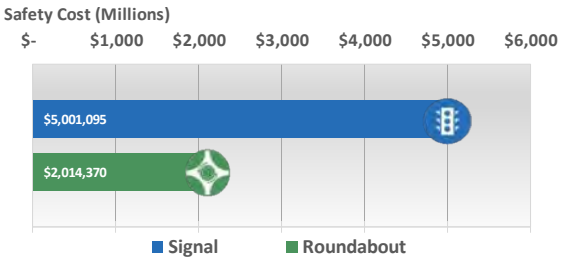
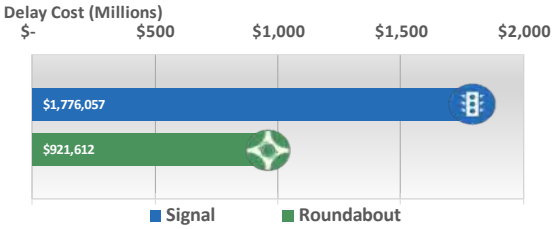
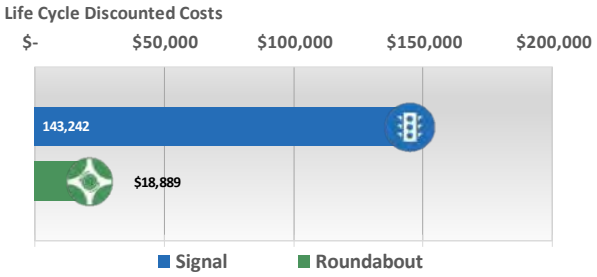
Table 6: Intersection 3 Operations Summary

Control Type	Year	Period	Delay	LOS	Queue		v/c
					Length (ft)	Approach	
Signal	2025	AM	10.8	B	130	NB	-
		PM	11.3	B	190	SB	-
	2045	AM	11.6	B	156	SB	-
		PM	12.6	B	160	SB	-
Roundabout	2025	AM	6.1	A	55	WB	0.427
		PM	6.0	A	50	SB	0.344
	2045	AM	6.1	A	50	WB	0.391
		PM	5.7	A	50	SB	0.323

Performance Measure Summary

Four performance measures were evaluated at each intersection for signal and roundabout control. **Table 16** below summarizes the performance measures considered in this study.

Table 7: Intersection 3 Performance Measure Summary

Performance Measure	Preferred Alt.	Visual Representation
Benefits		
Safety Safety measures the societal cost associated with the predicted number and severity and collisions. Overall societal costs are based on Caltrans Vehicle Operation Cost Parameters. Injury and Fatality crashes are on average 700-1,000 times more expensive than Property Damage Only accidents. Further details can be found in **Appendix D**.		
Delay Delay measures the societal cost associated with the number of person-hours delayed in traffic. Overall societal costs are based on Caltrans Vehicle Operation Cost Parameters.		
Costs		
Operations and Maintenance O&M measures the common annualized costs associated with operating and maintaining the intersection.		
Initial Capital Cost Measures the Initial Capital Costs (ICC) needed to plan, design, obtain project approvals, acquire right-of-way, and construct the intersection control. This graph (right) depicts the estimated range of Initial capital costs for the signal and roundabout alternatives.		

Intersection Life Cycle Cost Calculations

Table 17 summarizes the net present value of each of the four different performance measures as well as the lifecycle benefit-cost ratio when comparing the roundabout to the AWSC.

Table 8: Intersection 3 B/C Analysis of Alternatives

PERFORMANCE MEASURE LIFE CYCLE COST (NET PRESENT VALUE)		
Safety		
	Signal	**Roundabout**
Annual Cost of Collisions	$317,849	$128,068
Discounted Life Cycle Cost of Collisions	$5,001,095	$2,014,370
Delay		
	Signal	**Roundabout**
Annual Quantity (hours)	4032	2079
Annual Cost	$84,574	$43,886
Total Discounted Life Cycle Cost	$1,776,057	$921,612
Operations and Maintenance		
	Signal	**Roundabout**
Annual O&M Costs	$9,100	$1,200
Discounted Life Cycle O&M Costs	$143,242	$18,889
Discounted Pavement Rehab Costs	$0	$0
Total O&M Costs	$143,242	$18,889
Initial Capital		
	Signal	**Roundabout**
High Approximation	$6,000,000	$6,000,000
Low Approximation	$4,000,000	$4,000,000
LIFE CYCLE BENEFIT COST RATIO		
Total Benefits (B)		
Added Benefits Compared to Signal	**Signal**	**Roundabout**
Safety	$-	$2,986,726
Delay	$-	$ 854,444
Total Benefits	**$-**	**$3,841,170**
Total Costs (C)		
Added Cost Compared to Signal	**Signal**	**Roundabout**
O&M	$ -	$ (124,353)
Initial Capital	$ -	$ -
Total Costs	**$ -**	**($124,353)**
B/C Ratio Compared to Signal	**N/A**	**-30.89**

The preferred control based on the B/C analysis is the roundabout. The B/C ratio is negative as the roundabout alternative has both more benefits and less cost when compared to the signal.

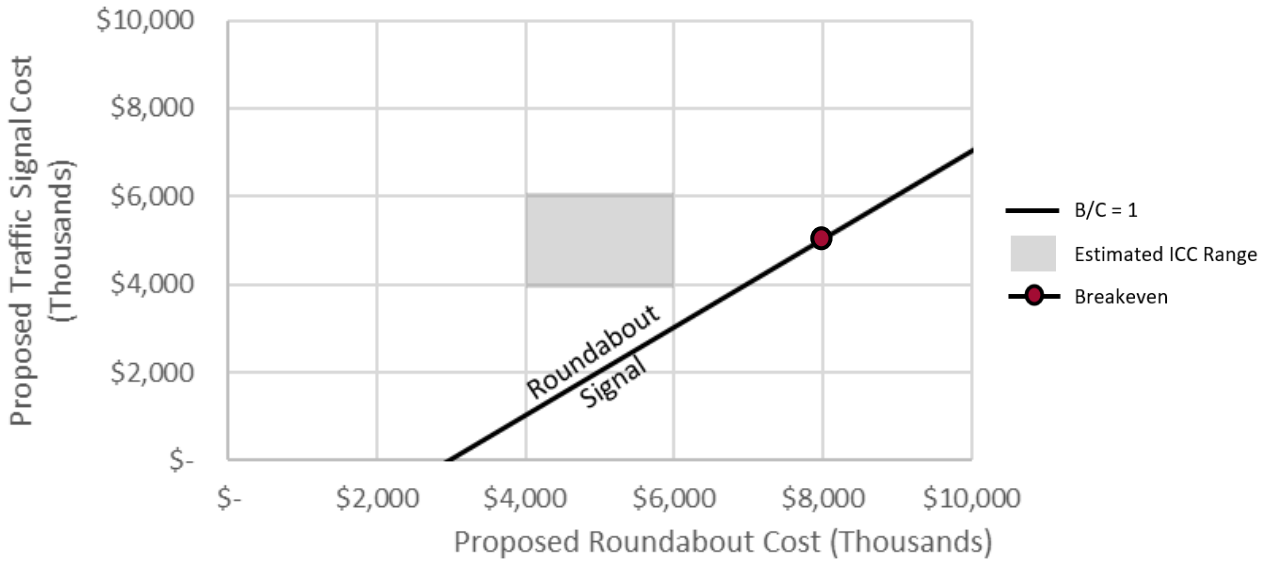
Table 18 below summarizes the B/C ratio calculations for comparing the roundabout to the signal alternative.

Table 9: Alternative Traffic Control Benefit-Cost Ratio Calculations

Benefit-Cost Ratio Calculations for Signal (A) vs Roundabout (B)							
	Initial Capital Cost			Project Constants			
B/C Target	Signal (A)	Roundabout (B)	Added Cost (C)=(B-A)	Added O&M Cost for Roundabout (D)	Total Benefits (E)	Total Costs (F)=(C+D)	B/C (G)=(E/F)
High	$ 6,000,000	$ 4,000,000	$ (2,000,000)			$ (2,018,889)	Roundabout Preferred
Low	$ 4,000,000	$ 6,000,000	$ 2,000,000	$ (18,889)	$ 2,935,982	$ 1,981,111	1.48
Breakeven	$ 5,000,000	$ 7,954,871	$ 2,954,871			$ 2,935,982	1.00

The high B/C target is calculated assuming the high-end of the traffic signal initial capital costs and the low-end of the roundabout initial capital costs.

The low B/C target is calculated assuming the low-end of the traffic signal initial capital costs and the high-end of the roundabout initial capital costs.



B/C Analysis Summary at Intersection 3

The table above summarizes the B/C analysis for Oak Avenue Parkway and Street D. The initial capital cost (ICC) ranges for the roundabout and signal options are represented by the grey box area. The black diagonal line represents a neutral B/C ratio of 1.0. If a pair of roundabout and signal ICC costs (x and y values) are above the black diagonal line, then the B/C ratio is greater than 1.0 and the roundabout option has the greater return on investment (ROI). If a pair of roundabout and signal ICC costs is below the black diagonal line, then the B/C ratio is less than 1.0 and the signal has the greater ROI. The roundabout budget is depicted with the circle symbol and represents how much can be spent on the roundabout ICC to achieve a neutral B/C equal to 1.0.

CONCLUSIONS

Table 19 summarizes the findings and observations of the ICE Study that was conducted at the three (3) intersections for Toll Brothers at Alder Creek.

Table 10: Summary of ICE Study Intersection Findings and Observations

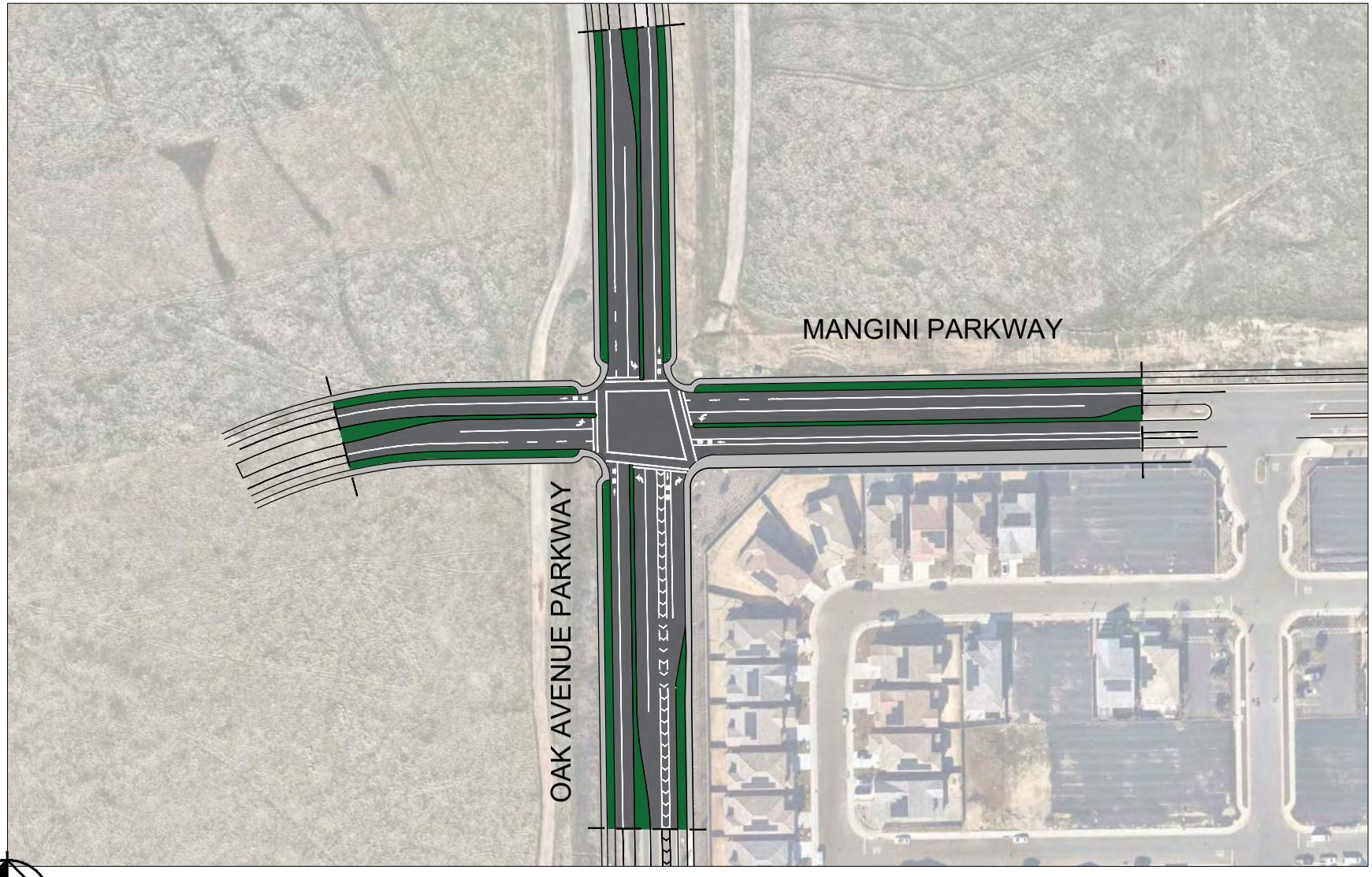
Intersection 1: Oak Avenue Parkway and Mangini Parkway
• The roundabout alternative has a negative B/C ratio which represents a savings in safety, delay and operations/maintenance when compared to the signal. • As seen in the benefit-cost ratio calculations and visualized in the graph, the roundabout is preferred for all cases within the estimated initial capital cost ranges. • The roundabout alternative provides an approximate $1.9M benefit over the traffic signal alternative. • The roundabout is the preferred alternative.
Intersection 2: Oak Avenue Parkway and Street D
• The AWSC and roundabout alternative have comparable B/C ratios using the range of initial capital costs, indicating that both alternatives are viable. • If Intersection 1 and Intersection 3 are roundabout controlled, a roundabout should be implemented at Intersection 2 to create consistent control types along Oak Avenue Parkway and Street D. • The single lane roundabout provides greater benefits to pedestrian safety when compared to the AWSC. The roundabout lowers vehicle speeds at the crosswalk, reduced the pedestrian length of crossing, and minimized the number of conflict points. • The roundabout and AWSC alternatives provide similar benefits; however, per the City of Folsom's policy language, a roundabout is the preferred alternative.
Intersection 3: Prairie City Road and Street D
• The roundabout alternative has a negative B/C ratio which represents a savings in safety, delay and operations/maintenance when compared to the signal. • As seen in the benefit-cost ratio calculations and visualized in the graph, the roundabout is preferred for all cases within the estimated initial capital cost ranges. • The roundabout alternative provides an approximate $4.0M benefit over the traffic signal alternative. • The roundabout is the preferred alternative.

Appendices

Appendix A – Intersection Control Concept Layouts
Appendix B – Side-Street Stop and Signal Synchro® Operational Analysis
Appendix C – Roundabout SIDRA® Operational Analysis
Appendix D – HSM Predictive Method Safety Analysis and IHSDM KABCO Values

Appendix A

Intersection Control Concept Layouts



NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

MANGINI PKWY AT OAK AVENUE PKWY CONCEPTS
CONCEPT LAYOUT OF PROPOSED SIGNAL

Kimley»Horn

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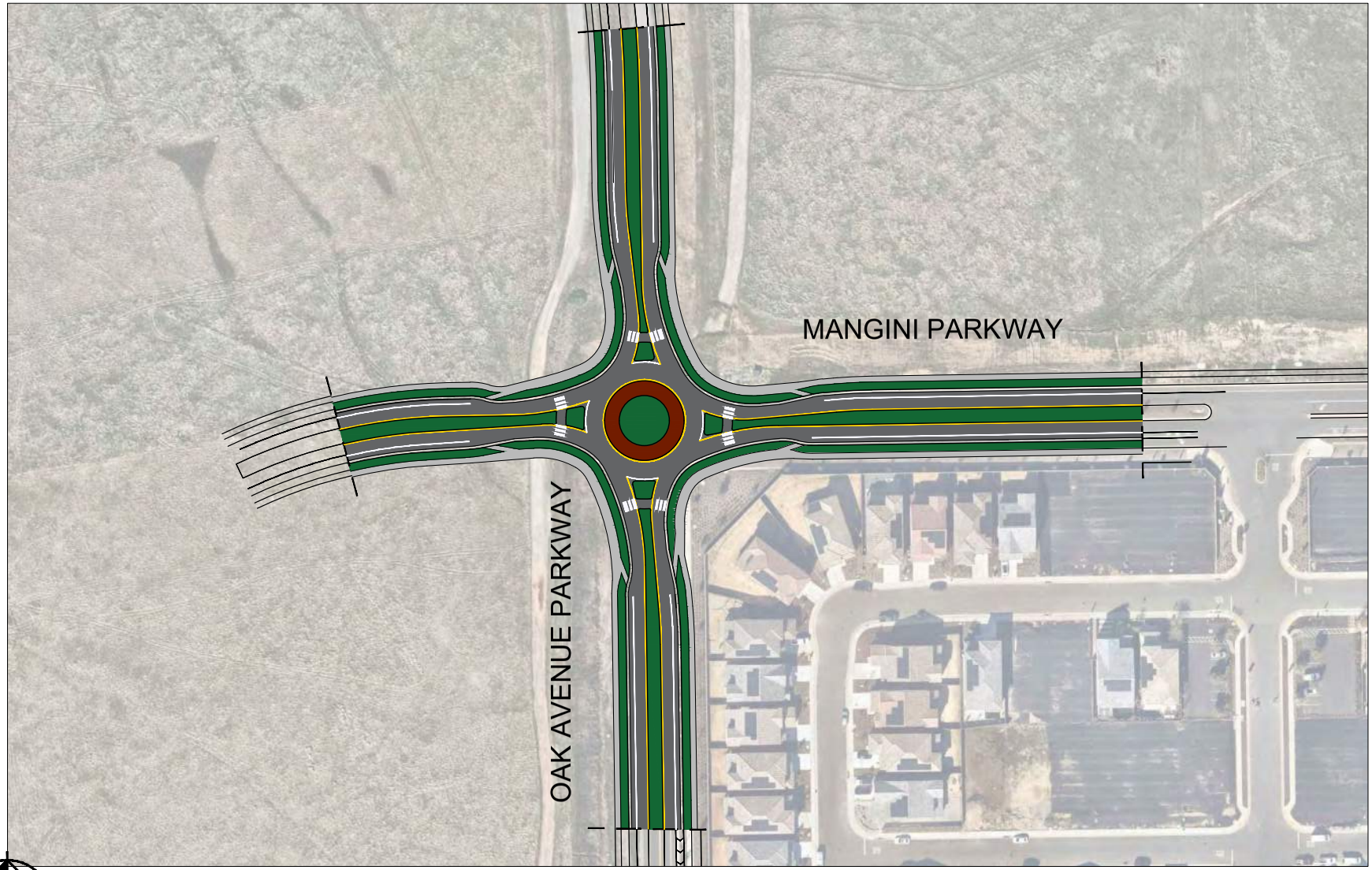

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

MANGINI PKWY AT OAK AVENUE PKWY CONCEPTS
CONCEPT LAYOUT OF PROPOSED ROUNDABOUT

Kimley»Horn

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NORTH

GRAPHIC SCALE IN FEET
0 30 60 120

STREET D AT OAK AVENUE PKWY CONCEPTS
CONCEPT LAYOUT OF PROPOSED ALL-WAY STOP CONTROL

Kimley»Horn

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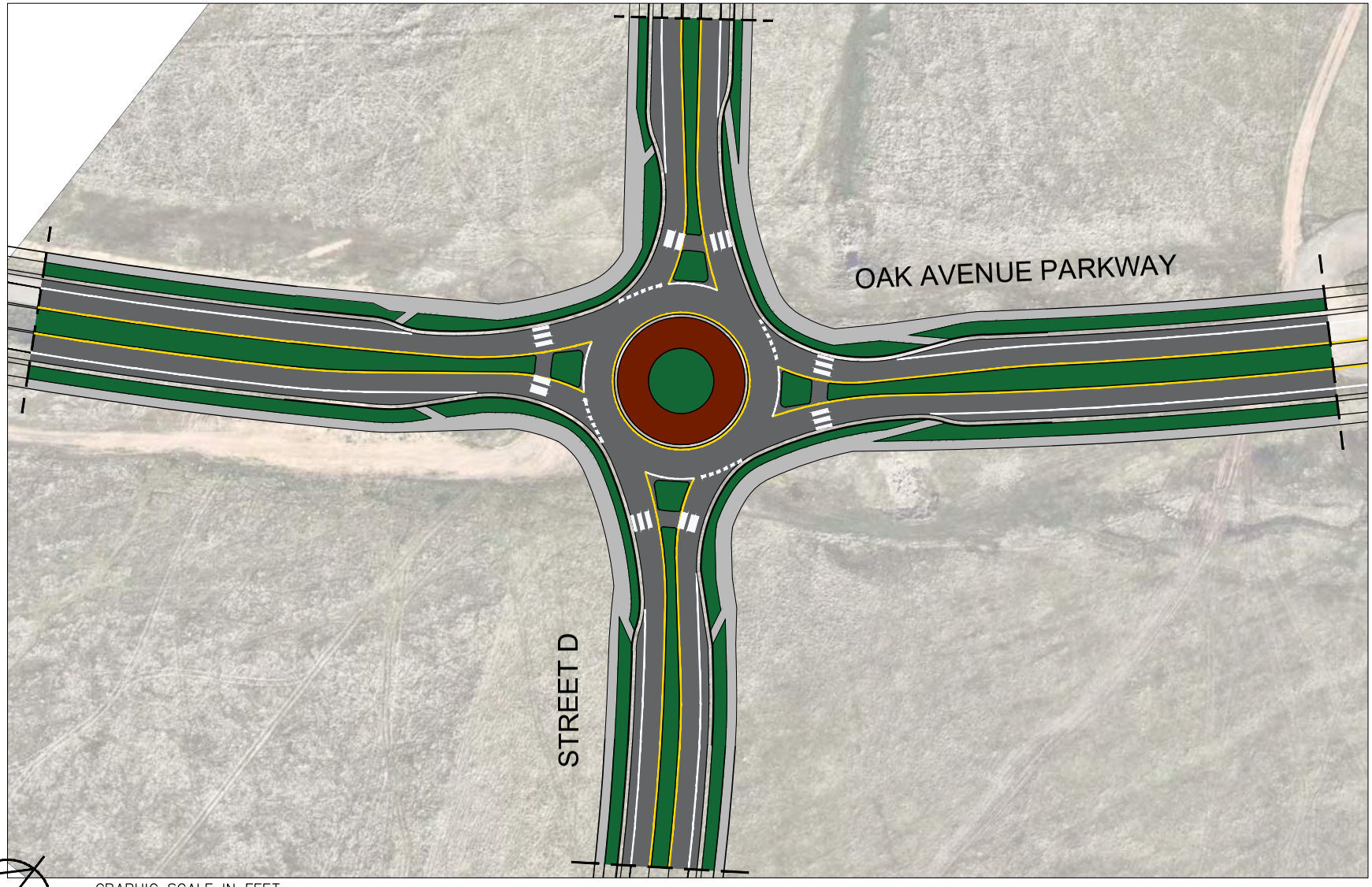

NORTH

GRAPHIC SCALE IN FEET
0 30 60 120

STREET D AT OAK AVENUE PKWY CONCEPTS
CONCEPT LAYOUT OF PROPOSED ROUNDABOUT

Kimley»Horn

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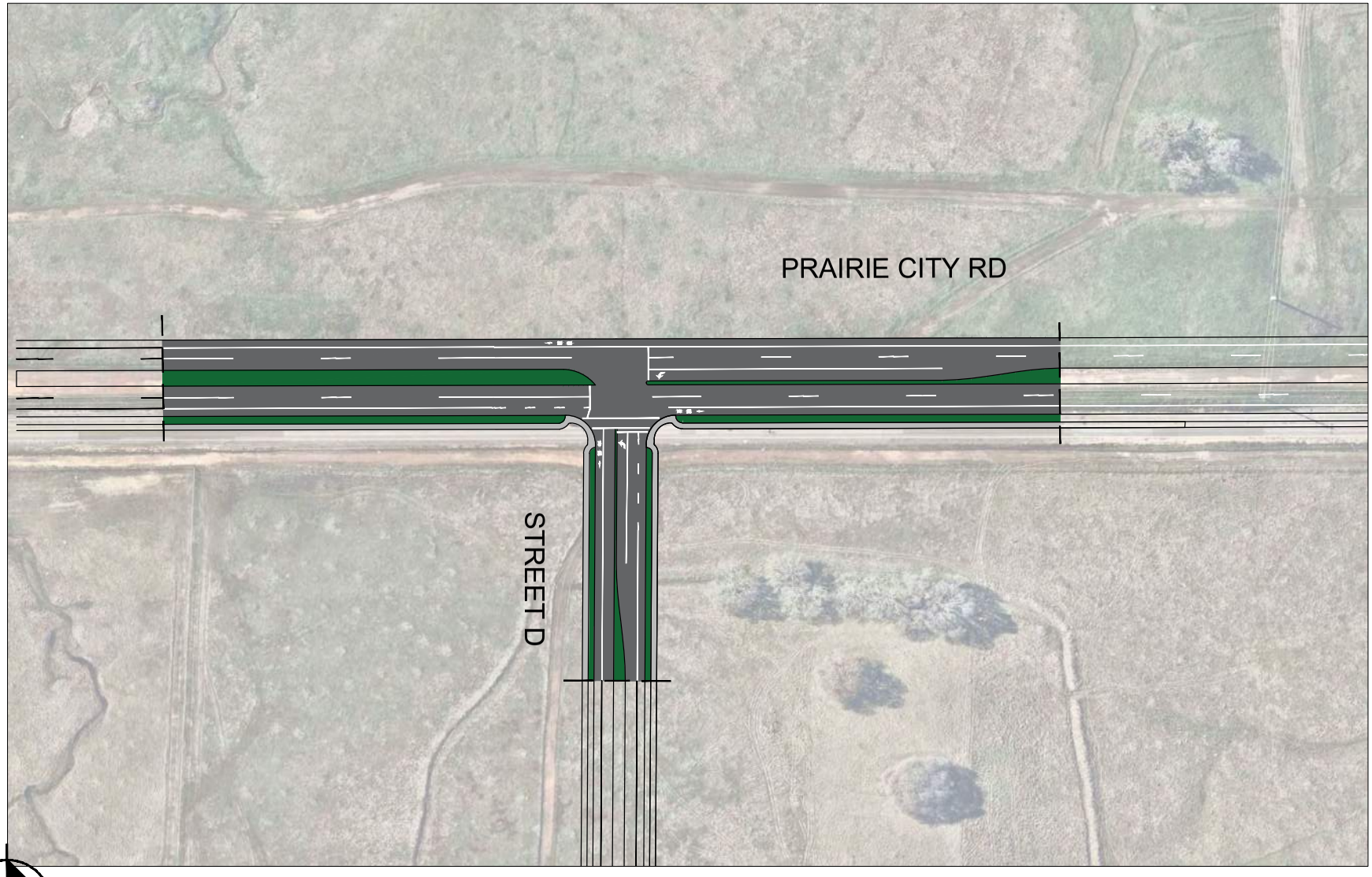

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

PRAIRIE CITY RD AT STREET D CONCEPTS
CONCEPT LAYOUT OF PROPOSED SIGNAL

Kimley»Horn

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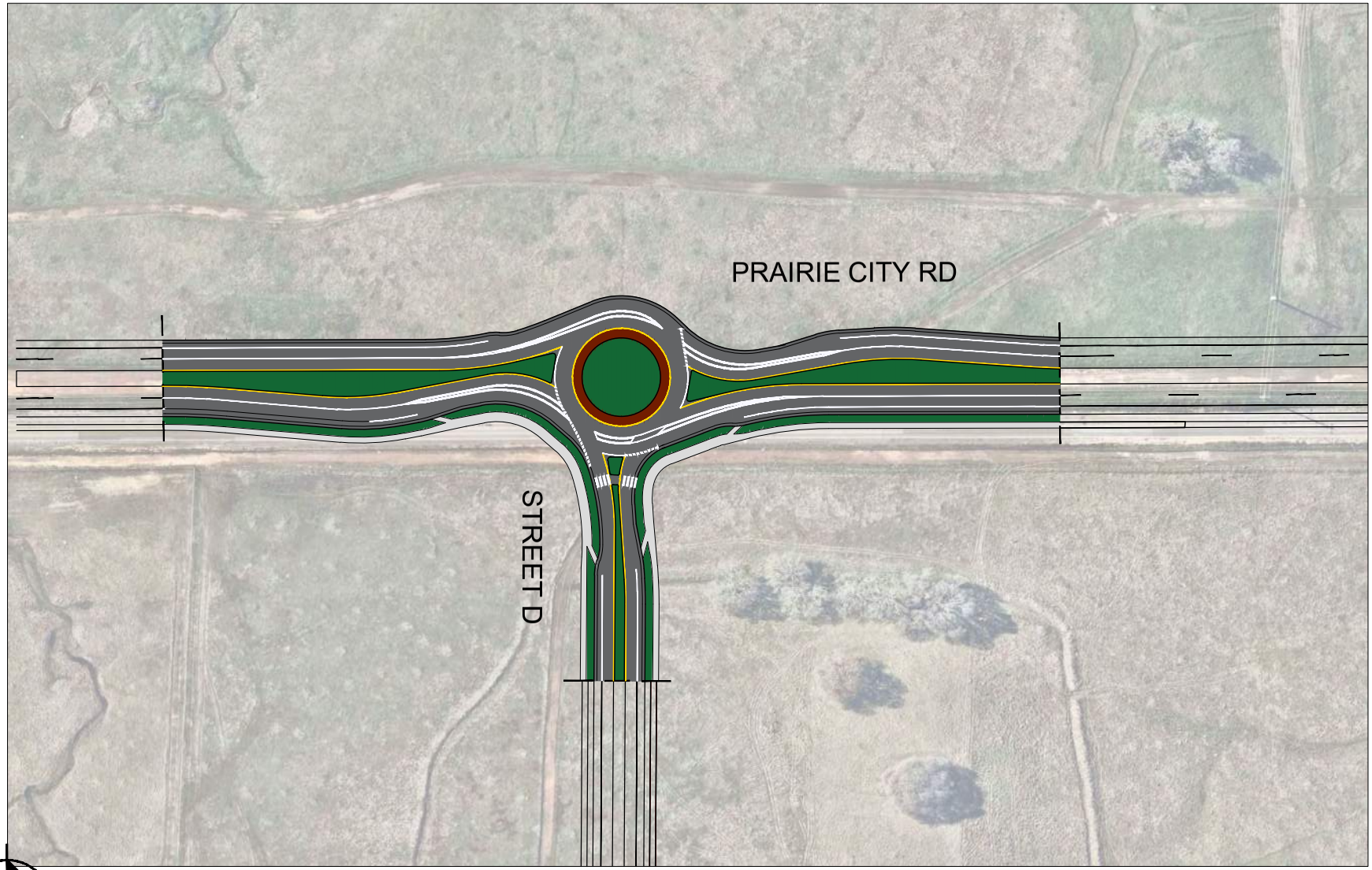

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

PRAIRIE CITY RD AT STREET D CONCEPTS
CONCEPT LAYOUT OF PROPOSED ROUNDABOUT

Kimley»Horn

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Appendix B

Side-Street Stop and Signal Synchro® Operational Analysis

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	29	14	37	10	69	5	21	18	145	60	1
Future Volume (vph)	4	29	14	37	10	69	5	21	18	145	60	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	400		0	200		132	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.952			0.869			0.930			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1773	0	1770	1619	0	1770	1732	0	1770	1859	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1773	0	1770	1619	0	1770	1732	0	1770	1859	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			75			20			1	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		290			615			346			357	
Travel Time (s)		4.9			10.5			5.9			6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	47	0	40	86	0	5	43	0	158	66	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5		9.6	22.6		9.5	23.4		9.5	23.4	
Total Split (%)	14.6%	34.6%		14.8%	34.8%		14.6%	36.0%		14.6%	36.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.5	6.8		5.7	6.7		5.5	9.5		5.5	22.3	
Actuated g/C Ratio	0.18	0.23		0.19	0.22		0.18	0.31		0.18	0.74	
v/c Ratio	0.01	0.11		0.12	0.21		0.02	0.08		0.49	0.05	
Control Delay (s/veh)	15.0	10.3		14.6	6.7		14.8	9.2		23.9	8.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	15.0	10.3		14.6	6.7		14.8	9.2		23.9	8.3	
LOS	B	B		B	A		B	A		C	A	
Approach Delay (s/veh)		10.7			9.2			9.8			19.3	
Approach LOS		B			A			A			B	
Queue Length 50th (ft)	0	2		2	1		1	1		11	0	
Queue Length 95th (ft)	7	27		30	29		8	24		#120	38	
Internal Link Dist (ft)		210			535			266			277	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	150			400			200			200		
Base Capacity (vph)	324	1177		331	1101		324	1224		324	1458	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.04		0.12	0.08		0.02	0.04		0.49	0.05	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 30.2			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay (s/veh): 14.5		Intersection LOS: B	
Intersection Capacity Utilization 30.9%		ICU Level of Service A	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Oak Avenue Pkwy & Mangini Pkwy

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	29	14	37	10	69	5	21	18	145	60	1
Future Volume (veh/h)	4	29	14	37	10	69	5	21	18	145	60	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	4	32	15	40	11	75	5	23	20	158	65	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	10	133	62	83	31	214	12	145	126	211	494	8
Arrive On Green	0.01	0.11	0.11	0.05	0.15	0.15	0.01	0.16	0.16	0.12	0.27	0.27
Sat Flow, veh/h	1781	1204	564	1781	207	1410	1781	923	803	1781	1837	28
Grp Volume(v), veh/h	4	0	47	40	0	86	5	0	43	158	0	66
Grp Sat Flow(s),veh/h/ln	1781	0	1769	1781	0	1617	1781	0	1726	1781	0	1865
Q Serve(g_s), s	0.1	0.0	0.8	0.7	0.0	1.5	0.1	0.0	0.7	2.7	0.0	0.9
Cycle Q Clear(g_c), s	0.1	0.0	0.8	0.7	0.0	1.5	0.1	0.0	0.7	2.7	0.0	0.9
Prop In Lane	1.00		0.32	1.00		0.87	1.00		0.47	1.00		0.02
Lane Grp Cap(c), veh/h	10	0	195	83	0	245	12	0	272	211	0	502
V/C Ratio(X)	0.41	0.00	0.24	0.48	0.00	0.35	0.41	0.00	0.16	0.75	0.00	0.13
Avail Cap(c_a), veh/h	281	0	1003	286	0	922	281	0	1027	281	0	1110
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.7	0.0	12.9	14.8	0.0	12.1	15.7	0.0	11.6	13.5	0.0	8.8
Incr Delay (d2), s/veh	25.5	0.0	0.6	4.2	0.0	0.9	21.0	0.0	0.3	7.5	0.0	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.3	0.3	0.0	0.4	0.1	0.0	0.2	1.2	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	41.2	0.0	13.5	19.0	0.0	12.9	36.7	0.0	11.8	21.1	0.0	8.9
LnGrp LOS	D		B	B		B	D		B	C		A
Approach Vol, veh/h		51			126			48			224	
Approach Delay, s/veh		15.7			14.8			14.4			17.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	9.5	6.0	8.0	4.7	13.0	4.7	9.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	18.9	5.1	18.0	5.0	18.9	5.0	18.1
Max Q Clear Time (g_c+I1), s	4.7	2.7	2.7	2.8	2.1	2.9	2.1	3.5
Green Ext Time (p_c), s	0.0	0.1	0.0	0.1	0.0	0.2	0.0	0.3

Intersection Summary	
HCM 7th Control Delay, s/veh	16.2
HCM 7th LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	16	65	62	45	0	109	2	22	0	4	2
Future Volume (vph)	1	16	65	62	45	0	109	2	22	0	4	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		0	200		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.892						0.862			0.950	
Flt Protected		0.999			0.972		0.950					
Satd. Flow (prot)	0	1660	0	0	1811	0	1770	1606	0	1863	1770	0
Flt Permitted		0.999			0.972		0.950					
Satd. Flow (perm)	0	1660	0	0	1811	0	1770	1606	0	1863	1770	0
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		391			404			398			448	
Travel Time (s)		8.9			9.2			6.8			7.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	89	0	0	116	0	118	26	0	0	6	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	16	65	62	45	0	109	2	22	0	4	2
Future Vol, veh/h	1	16	65	62	45	0	109	2	22	0	4	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	17	71	67	49	0	118	2	24	0	4	2
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay, s/veh	7.5	8.3	9	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	1%	58%	0%	0%
Vol Thru, %	0%	8%	20%	42%	100%	67%
Vol Right, %	0%	92%	79%	0%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	109	24	82	107	0	6
LT Vol	109	0	1	62	0	0
Through Vol	0	2	16	45	0	4
RT Vol	0	22	65	0	0	2
Lane Flow Rate	118	26	89	116	0	7
Geometry Grp	5	5	2	2	5	5
Degree of Util (X)	0.181	0.032	0.099	0.147	0	0.009
Departure Headway (Hd)	5.496	4.35	3.998	4.546	5.139	4.904
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	654	824	898	791	0	730
Service Time	3.217	2.071	2.013	2.56	2.865	2.631
HCM Lane V/C Ratio	0.18	0.032	0.099	0.147	0	0.01
HCM Control Delay, s/veh	9.4	7.2	7.5	8.3	7.9	7.7
HCM Lane LOS	A	A	A	A	N	A
HCM 95th-tile Q	0.7	0.1	0.3	0.5	0	0

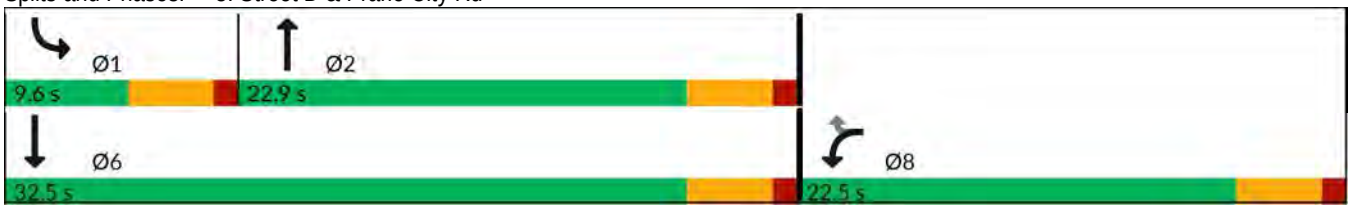
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	41	233	706	14	82	430
Future Volume (vph)	41	233	706	14	82	430
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	0		0	200	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt		0.850	0.997			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3529	0	1770	3539
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1583	3529	0	1770	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		253	4			
Link Speed (mph)	30		45			45
Link Distance (ft)	415		281			280
Travel Time (s)	9.4		4.3			4.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	253	782	0	89	467
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	22.5	22.5	22.5		9.5	22.5
Total Split (s)	22.5	22.5	22.9		9.6	32.5
Total Split (%)	40.9%	40.9%	41.6%		17.5%	59.1%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	Min		None	Min
Act Effct Green (s)	7.2	7.2	17.8		5.3	23.0
Actuated g/C Ratio	0.18	0.18	0.45		0.13	0.58
v/c Ratio	0.14	0.51	0.49		0.38	0.23
Control Delay (s/veh)	15.8	7.0	10.5		23.5	4.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	15.8	7.0	10.5		23.5	4.4
LOS	B	A	B		C	A
Approach Delay (s/veh)	8.3		10.5			7.5
Approach LOS	A		B			A
Queue Length 50th (ft)	9	0	70		19	18
Queue Length 95th (ft)	30	44	130		#65	44
Internal Link Dist (ft)	335		201			200

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Turn Bay Length (ft)	100				200	
Base Capacity (vph)	832	878	1788		235	2588
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.05	0.29	0.44		0.38	0.18

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 39.5			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay (s/veh): 9.0		Intersection LOS: A	
Intersection Capacity Utilization 41.9%		ICU Level of Service A	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Street D & Prarie City Rd



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	41	233	706	14	82	430
Future Volume (veh/h)	41	233	706	14	82	430
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	45	253	767	15	89	467
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	381	339	1166	23	146	1900
Arrive On Green	0.21	0.21	0.33	0.33	0.08	0.53
Sat Flow, veh/h	1781	1585	3658	70	1781	3647
Grp Volume(v), veh/h	45	253	382	400	89	467
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1858	1781	1777
Q Serve(g_s), s	0.7	5.3	6.6	6.6	1.7	2.5
Cycle Q Clear(g_c), s	0.7	5.3	6.6	6.6	1.7	2.5
Prop In Lane	1.00	1.00		0.04	1.00	
Lane Grp Cap(c), veh/h	381	339	581	608	146	1900
V/C Ratio(X)	0.12	0.75	0.66	0.66	0.61	0.25
Avail Cap(c_a), veh/h	895	797	913	955	254	2779
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.4	13.2	10.3	10.3	15.9	4.5
Incr Delay (d2), s/veh	0.1	3.3	1.3	1.2	4.1	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.8	1.7	1.8	0.7	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	11.5	16.4	11.6	11.6	19.9	4.5
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	298		782			556
Approach Delay, s/veh	15.7		11.6			7.0
Approach LOS	B		B			A

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.4	16.2			23.6	12.2
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	5.1	18.4			28.0	18.0
Max Q Clear Time (g_c+I1), s	3.7	8.6			4.5	7.3
Green Ext Time (p_c), s	0.0	3.1			2.8	0.7

Intersection Summary			
HCM 7th Control Delay, s/veh		10.8	
HCM 7th LOS		B	

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	2	19	10	1	28	33	169	17	66	27	114	36
Future Volume (vph)	2	19	10	1	28	33	169	17	66	27	114	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0		400		0	200		132	200	
Storage Lanes	1		0		1		0	1		0	1	
Taper Length (ft)	25				25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.948				0.875			0.957			0.986
Flt Protected	0.950				0.950			0.950			0.950	
Satd. Flow (prot)	1770	1766	0	0	1770	1630	0	1770	1783	0	1770	1837
Flt Permitted	0.950				0.950			0.950			0.950	
Satd. Flow (perm)	1770	1766	0	0	1770	1630	0	1770	1783	0	1770	1837
Right Turn on Red			Yes				Yes			Yes		
Satd. Flow (RTOR)		11				184			29			4
Link Speed (mph)		40				40			40			40
Link Distance (ft)		290				615			346			357
Travel Time (s)		4.9				10.5			5.9			6.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	32	0	0	31	220	0	18	101	0	124	43
Turn Type	Prot	NA		Prot	Prot	NA		Prot	NA		Prot	NA
Protected Phases	7	4		3	3	8		5	2		1	6
Permitted Phases												
Detector Phase	7	4		3	3	8		5	2		1	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	9.5	22.5		9.5	22.5		9.5	22.5
Total Split (s)	9.5	22.5		9.6	9.6	22.6		9.5	23.4		9.5	23.4
Total Split (%)	14.6%	34.6%		14.8%	14.8%	34.8%		14.6%	36.0%		14.6%	36.0%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0		1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lead	Lag		Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes
Recall Mode	None	None		None	None	None		None	Min		None	Min
Act Effct Green (s)	5.2	7.1			5.3	7.1		5.2	8.7		5.2	17.0
Actuated g/C Ratio	0.14	0.20			0.15	0.20		0.14	0.24		0.14	0.47
v/c Ratio	0.01	0.09			0.12	0.47		0.07	0.23		0.49	0.05
Control Delay (s/veh)	17.0	11.1			17.4	8.0		17.2	11.7		27.2	9.6
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0		0.0	0.0
Total Delay (s/veh)	17.0	11.1			17.4	8.0		17.2	11.7		27.2	9.6
LOS	B	B			B	A		B	B		C	A
Approach Delay (s/veh)		11.5				9.1			12.5			22.7
Approach LOS		B				A			B			C
Queue Length 50th (ft)	0	3			4	5		3	10		19	3
Queue Length 95th (ft)	5	21			27	51		19	49		#103	29
Internal Link Dist (ft)		210				535			266			277

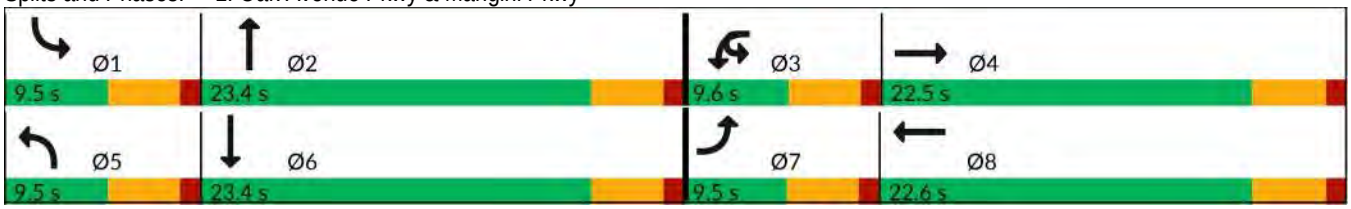
Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	4
Future Volume (vph)	4
Ideal Flow (vphpl)	1900
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	1.00
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.92
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
LOS	
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Turn Bay Length (ft)	150				400			200			200	
Base Capacity (vph)	251	910			256	928		251	972		251	1022
Starvation Cap Reductn	0	0			0	0		0	0		0	0
Spillback Cap Reductn	0	0			0	0		0	0		0	0
Storage Cap Reductn	0	0			0	0		0	0		0	0
Reduced v/c Ratio	0.01	0.04			0.12	0.24		0.07	0.10		0.49	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 36.2			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay (s/veh): 13.9		Intersection LOS: B	
Intersection Capacity Utilization 32.6%		ICU Level of Service A	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Oak Avenue Pkwy & Mangini Pkwy



Lane Group	SBR
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	2	19	10	1	28	33	169	17	66	27	114	36
Future Volume (veh/h)	2	19	10	1	28	33	169	17	66	27	114	36
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No				No			No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870		1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	2	21	11		30	36	184	18	72	29	124	39
Peak Hour Factor	0.92	0.92	0.92		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	5	190	99		65	53	269	41	192	77	183	386
Arrive On Green	0.00	0.16	0.16		0.04	0.20	0.20	0.02	0.15	0.15	0.10	0.23
Sat Flow, veh/h	1781	1156	605		1781	266	1360	1781	1268	511	1781	1668
Grp Volume(v), veh/h	2	0	32		30	0	220	18	0	101	124	0
Grp Sat Flow(s),veh/h/ln	1781	0	1761		1781	0	1626	1781	0	1778	1781	0
Q Serve(g_s), s	0.0	0.0	0.5		0.5	0.0	4.1	0.3	0.0	1.7	2.2	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.5		0.5	0.0	4.1	0.3	0.0	1.7	2.2	0.0
Prop In Lane	1.00		0.34		1.00		0.84	1.00		0.29	1.00	
Lane Grp Cap(c), veh/h	5	0	289		65	0	321	41	0	269	183	0
V/C Ratio(X)	0.37	0.00	0.11		0.46	0.00	0.68	0.44	0.00	0.37	0.68	0.00
Avail Cap(c_a), veh/h	270	0	960		275	0	891	270	0	1018	270	0
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00		1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.4	0.0	11.7		15.6	0.0	12.3	15.9	0.0	12.6	14.3	0.0
Incr Delay (d2), s/veh	37.5	0.0	0.2		5.0	0.0	2.6	7.2	0.0	0.9	4.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.2		0.3	0.0	1.2	0.2	0.0	0.5	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	53.9	0.0	11.9		20.6	0.0	14.9	23.1	0.0	13.5	18.6	0.0
LnGrp LOS	D		B		C		B	C		B	B	
Approach Vol, veh/h		34				250			119			167
Approach Delay, s/veh		14.4				15.6			14.9			16.4
Approach LOS		B				B			B			B

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.9	9.5	5.7	9.9	5.3	12.1	4.6	11.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	18.9	5.1	18.0	5.0	18.9	5.0	18.1
Max Q Clear Time (g_c+I1), s	4.2	3.7	2.5	2.5	2.3	2.6	2.0	6.1
Green Ext Time (p_c), s	0.0	0.3	0.0	0.1	0.0	0.1	0.0	0.9

Intersection Summary	
HCM 7th Control Delay, s/veh	15.6
HCM 7th LOS	B

Notes

User approved ignoring U-Turning movement.

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	4
Future Volume (veh/h)	4
Initial Q (Qb), veh	0
Lane Width Adj.	1.00
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1870
Adj Flow Rate, veh/h	4
Peak Hour Factor	0.92
Percent Heavy Veh, %	2
Cap, veh/h	40
Arrive On Green	0.23
Sat Flow, veh/h	171
Grp Volume(v), veh/h	43
Grp Sat Flow(s),veh/h/ln	1840
Q Serve(g_s), s	0.6
Cycle Q Clear(g_c), s	0.6
Prop In Lane	0.09
Lane Grp Cap(c), veh/h	425
V/C Ratio(X)	0.10
Avail Cap(c_a), veh/h	1053
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	10.0
Incr Delay (d2), s/veh	0.1
Initial Q Delay(d3), s/veh	0.0
%ile BackOfQ(50%),veh/ln	0.2
Unsig. Movement Delay, s/veh	
LnGrp Delay(d), s/veh	10.1
LnGrp LOS	B
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	50	128	42	29	0	100	6	71	0	4	2
Future Volume (vph)	3	50	128	42	29	0	100	6	71	0	4	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		0	200		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.904						0.862			0.950	
Flt Protected		0.999			0.971		0.950					
Satd. Flow (prot)	0	1682	0	0	1809	0	1770	1606	0	1863	1770	0
Flt Permitted		0.999			0.971		0.950					
Satd. Flow (perm)	0	1682	0	0	1809	0	1770	1606	0	1863	1770	0
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		391			404			398			448	
Travel Time (s)		8.9			9.2			6.8			7.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	196	0	0	78	0	109	84	0	0	6	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	50	128	42	29	0	100	6	71	0	4	2
Future Vol, veh/h	3	50	128	42	29	0	100	6	71	0	4	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	54	139	46	32	0	109	7	77	0	4	2
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay, s/veh	8.3	8.3	8.7	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	2%	59%	0%	0%
Vol Thru, %	0%	8%	28%	41%	100%	67%
Vol Right, %	0%	92%	71%	0%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	100	77	181	71	0	6
LT Vol	100	0	3	42	0	0
Through Vol	0	6	50	29	0	4
RT Vol	0	71	128	0	0	2
Lane Flow Rate	109	84	197	77	0	7
Geometry Grp	5	5	2	2	5	5
Degree of Util (X)	0.17	0.104	0.224	0.102	0	0.009
Departure Headway (Hd)	5.64	4.489	4.104	4.756	5.341	5.106
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	637	798	877	755	0	700
Service Time	3.37	2.218	2.121	2.779	3.08	2.844
HCM Lane V/C Ratio	0.171	0.105	0.225	0.102	0	0.01
HCM Control Delay, s/veh	9.5	7.7	8.3	8.3	8.1	7.9
HCM Lane LOS	A	A	A	A	N	A
HCM 95th-tile Q	0.6	0.3	0.9	0.3	0	0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	27	155	574	46	262	595
Future Volume (vph)	27	155	574	46	262	595
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	0		0	200	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt		0.850	0.989			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3500	0	1770	3539
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1583	3500	0	1770	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		168	14			
Link Speed (mph)	30		45			45
Link Distance (ft)	415		281			280
Travel Time (s)	9.4		4.3			4.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	29	168	674	0	285	647
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	22.5	22.5	22.5		9.5	22.5
Total Split (s)	22.5	22.5	22.5		15.0	37.5
Total Split (%)	37.5%	37.5%	37.5%		25.0%	62.5%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	Min		None	Min
Act Effct Green (s)	6.9	6.9	14.7		10.8	31.4
Actuated g/C Ratio	0.16	0.16	0.34		0.25	0.72
v/c Ratio	0.10	0.43	0.57		0.65	0.25
Control Delay (s/veh)	18.4	7.9	14.4		27.5	3.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	18.4	7.9	14.4		27.5	3.5
LOS	B	A	B		C	A
Approach Delay (s/veh)	9.4		14.4			10.9
Approach LOS	A		B			B
Queue Length 50th (ft)	7	0	72		66	26
Queue Length 95th (ft)	25	39	126		#190	56
Internal Link Dist (ft)	335		201			200

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Turn Bay Length (ft)	100				200	
Base Capacity (vph)	755	772	1503		441	2725
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.22	0.45		0.65	0.24

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 43.5			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay (s/veh): 12.0		Intersection LOS: B	
Intersection Capacity Utilization 47.3%		ICU Level of Service A	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Street D & Prarie City Rd

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	27	155	574	46	262	595
Future Volume (veh/h)	27	155	574	46	262	595
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	29	168	624	50	285	647
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	259	231	965	77	358	2175
Arrive On Green	0.15	0.15	0.29	0.29	0.20	0.61
Sat Flow, veh/h	1781	1585	3426	267	1781	3647
Grp Volume(v), veh/h	29	168	332	342	285	647
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1822	1781	1777
Q Serve(g_s), s	0.5	3.8	6.1	6.1	5.6	3.2
Cycle Q Clear(g_c), s	0.5	3.8	6.1	6.1	5.6	3.2
Prop In Lane	1.00	1.00		0.15	1.00	
Lane Grp Cap(c), veh/h	259	231	515	528	358	2175
V/C Ratio(X)	0.11	0.73	0.65	0.65	0.80	0.30
Avail Cap(c_a), veh/h	864	769	862	884	504	3159
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.8	15.2	11.5	11.5	14.1	3.4
Incr Delay (d2), s/veh	0.2	4.4	1.4	1.3	5.9	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.4	1.7	1.8	2.2	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	14.0	19.5	12.9	12.9	20.0	3.5
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	197		674			932
Approach Delay, s/veh	18.7		12.9			8.5
Approach LOS	B		B			A

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.0	15.2			27.2	9.9
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	10.5	18.0			33.0	18.0
Max Q Clear Time (g_c+I1), s	7.6	8.1			5.2	5.8
Green Ext Time (p_c), s	0.2	2.7			4.2	0.5

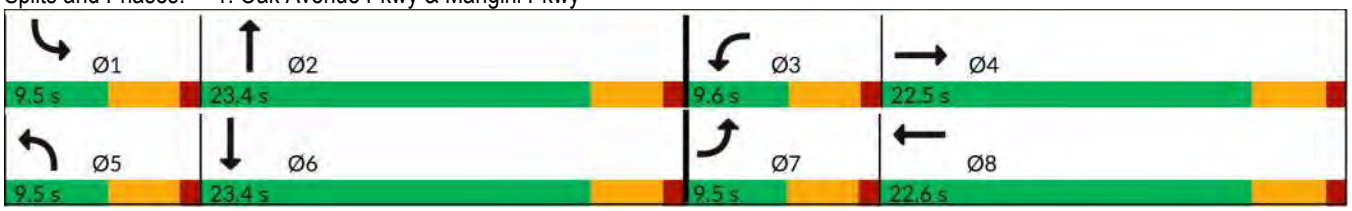
Intersection Summary	
HCM 7th Control Delay, s/veh	11.3
HCM 7th LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	90	10	60	40	30	10	240	40	30	320	20
Future Volume (vph)	30	90	10	60	40	30	10	240	40	30	320	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	400		0	200		132	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.985			0.935			0.979			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1835	0	1770	1742	0	1770	1824	0	1770	1846	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1835	0	1770	1742	0	1770	1824	0	1770	1846	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			33			13			5	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		290			615			346			357	
Travel Time (s)		4.9			10.5			5.9			6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	109	0	65	76	0	11	304	0	33	370	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5		9.6	22.6		9.5	23.4		9.5	23.4	
Total Split (%)	14.6%	34.6%		14.8%	34.8%		14.6%	36.0%		14.6%	36.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.8	8.5		5.9	10.2		5.8	23.4		5.8	24.9	
Actuated g/C Ratio	0.15	0.21		0.15	0.26		0.15	0.59		0.15	0.63	
v/c Ratio	0.13	0.27		0.25	0.16		0.04	0.28		0.13	0.32	
Control Delay (s/veh)	23.5	18.1		24.1	12.2		23.0	12.6		23.5	11.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	23.5	18.1		24.1	12.2		23.0	12.6		23.5	11.4	
LOS	C	B		C	B		C	B		C	B	
Approach Delay (s/veh)		19.4			17.7			13.0			12.4	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	7	19		13	5		2	49		7	64	
Queue Length 95th (ft)	34	68		55	42		17	146		34	184	
Internal Link Dist (ft)		210			535			266			277	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	150			400			200			200		
Base Capacity (vph)	256	960		261	928		256	1103		256	1154	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.11		0.25	0.08		0.04	0.28		0.13	0.32	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 39.8			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.32			
Intersection Signal Delay (s/veh): 14.3		Intersection LOS: B	
Intersection Capacity Utilization 42.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Oak Avenue Pkwy & Mangini Pkwy



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	90	10	60	40	30	10	240	40	30	320	20
Future Volume (veh/h)	30	90	10	60	40	30	10	240	40	30	320	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	98	11	65	43	33	11	261	43	33	348	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	70	207	23	119	150	115	26	399	66	70	487	31
Arrive On Green	0.04	0.13	0.13	0.07	0.15	0.15	0.01	0.26	0.26	0.04	0.28	0.28
Sat Flow, veh/h	1781	1652	185	1781	982	753	1781	1566	258	1781	1741	110
Grp Volume(v), veh/h	33	0	109	65	0	76	11	0	304	33	0	370
Grp Sat Flow(s),veh/h/ln	1781	0	1837	1781	0	1735	1781	0	1824	1781	0	1851
Q Serve(g_s), s	0.6	0.0	1.9	1.2	0.0	1.4	0.2	0.0	5.2	0.6	0.0	6.3
Cycle Q Clear(g_c), s	0.6	0.0	1.9	1.2	0.0	1.4	0.2	0.0	5.2	0.6	0.0	6.3
Prop In Lane	1.00		0.10	1.00		0.43	1.00		0.14	1.00		0.06
Lane Grp Cap(c), veh/h	70	0	231	119	0	266	26	0	465	70	0	518
V/C Ratio(X)	0.47	0.00	0.47	0.55	0.00	0.29	0.43	0.00	0.65	0.47	0.00	0.71
Avail Cap(c_a), veh/h	254	0	943	259	0	895	254	0	983	254	0	997
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.5	0.0	14.3	15.8	0.0	13.1	17.1	0.0	11.7	16.5	0.0	11.4
Incr Delay (d2), s/veh	4.9	0.0	1.5	3.8	0.0	0.6	10.7	0.0	1.6	4.9	0.0	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.7	0.5	0.0	0.4	0.1	0.0	1.6	0.3	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	21.4	0.0	15.8	19.7	0.0	13.7	27.9	0.0	13.2	21.4	0.0	13.2
LnGrp LOS	C		B	B		B	C		B	C		B
Approach Vol, veh/h		142			141			315			403	
Approach Delay, s/veh		17.1			16.5			13.7			13.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.9	13.4	6.8	8.9	5.0	14.3	5.9	9.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	18.9	5.1	18.0	5.0	18.9	5.0	18.1
Max Q Clear Time (g_c+I1), s	2.6	7.2	3.2	3.9	2.2	8.3	2.6	3.4
Green Ext Time (p_c), s	0.0	1.2	0.0	0.4	0.0	1.5	0.0	0.2

Intersection Summary	
HCM 7th Control Delay, s/veh	14.7
HCM 7th LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	30	150	0	50	50	200	190	0	20	160	10
Future Volume (vph)	30	30	150	0	50	50	200	190	0	20	160	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		0	200		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.904			0.932						0.991	
Flt Protected		0.993					0.950			0.950		
Satd. Flow (prot)	0	1672	0	0	1736	0	1770	1863	0	1770	1846	0
Flt Permitted		0.993					0.950			0.950		
Satd. Flow (perm)	0	1672	0	0	1736	0	1770	1863	0	1770	1846	0
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		391			404			398			448	
Travel Time (s)		8.9			9.2			6.8			7.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	229	0	0	108	0	217	207	0	22	185	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	30	150	0	50	50	200	190	0	20	160	10
Future Vol, veh/h	30	30	150	0	50	50	200	190	0	20	160	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	33	163	0	54	54	217	207	0	22	174	11
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay, s/veh	11.2	10	12.2	11.3
HCM LOS	B	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	14%	0%	100%	0%
Vol Thru, %	0%	100%	14%	50%	0%	94%
Vol Right, %	0%	0%	71%	50%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	200	190	210	100	20	170
LT Vol	200	0	30	0	20	0
Through Vol	0	190	30	50	0	160
RT Vol	0	0	150	50	0	10
Lane Flow Rate	217	207	228	109	22	185
Geometry Grp	5	5	2	2	5	5
Degree of Util (X)	0.381	0.333	0.341	0.173	0.04	0.311
Departure Headway (Hd)	6.306	5.799	5.381	5.718	6.611	6.062
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	572	620	667	625	541	593
Service Time	4.042	3.535	3.427	3.772	4.356	3.806
HCM Lane V/C Ratio	0.379	0.334	0.342	0.174	0.041	0.312
HCM Control Delay, s/veh	12.9	11.4	11.2	10	9.6	11.5
HCM Lane LOS	B	B	B	A	A	B
HCM 95th-tile Q	1.8	1.5	1.5	0.6	0.1	1.3

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	240	710	10	170	440
Future Volume (vph)	10	240	710	10	170	440
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	0		0	200	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt		0.850	0.998			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3532	0	1770	3539
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1583	3532	0	1770	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		261	2			
Link Speed (mph)	30		45			45
Link Distance (ft)	415		281			280
Travel Time (s)	9.4		4.3			4.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	261	783	0	185	478
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	22.5	22.5	22.5		9.5	22.5
Total Split (s)	22.5	22.5	22.5		15.0	37.5
Total Split (%)	37.5%	37.5%	37.5%		25.0%	62.5%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	Min		None	Min
Act Effct Green (s)	7.1	7.1	17.4		9.3	28.3
Actuated g/C Ratio	0.16	0.16	0.39		0.21	0.63
v/c Ratio	0.04	0.55	0.57		0.51	0.21
Control Delay (s/veh)	17.6	8.2	14.4		22.9	3.8
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	17.6	8.2	14.4		22.9	3.8
LOS	B	A	B		C	A
Approach Delay (s/veh)	8.6		14.4			9.2
Approach LOS	A		B			A
Queue Length 50th (ft)	3	0	85		43	17
Queue Length 95th (ft)	13	48	160		105	46
Internal Link Dist (ft)	335		201			200

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Turn Bay Length (ft)	100				200	
Base Capacity (vph)	734	809	1471		428	2685
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.01	0.32	0.53		0.43	0.18

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 44.7			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.57			
Intersection Signal Delay (s/veh): 11.4		Intersection LOS: B	
Intersection Capacity Utilization 44.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Street D & Prarie City Rd

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	240	710	10	170	440
Future Volume (veh/h)	10	240	710	10	170	440
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	261	772	11	185	478
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	376	335	1119	16	241	1994
Arrive On Green	0.21	0.21	0.31	0.31	0.14	0.56
Sat Flow, veh/h	1781	1585	3680	51	1781	3647
Grp Volume(v), veh/h	11	261	382	401	185	478
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1861	1781	1777
Q Serve(g_s), s	0.2	6.1	7.5	7.5	4.0	2.7
Cycle Q Clear(g_c), s	0.2	6.1	7.5	7.5	4.0	2.7
Prop In Lane	1.00	1.00		0.03	1.00	
Lane Grp Cap(c), veh/h	376	335	554	580	241	1994
V/C Ratio(X)	0.03	0.78	0.69	0.69	0.77	0.24
Avail Cap(c_a), veh/h	812	723	810	849	474	2970
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.4	14.7	11.9	11.9	16.5	4.4
Incr Delay (d2), s/veh	0.0	4.0	1.5	1.5	5.1	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	2.2	2.2	2.3	1.6	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	12.4	18.7	13.5	13.4	21.6	4.5
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	272		783			663
Approach Delay, s/veh	18.4		13.4			9.2
Approach LOS	B		B			A

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	9.8	16.8				26.6	12.8
Change Period (Y+Rc), s	4.5	4.5				4.5	4.5
Max Green Setting (Gmax), s	10.5	18.0				33.0	18.0
Max Q Clear Time (g_c+I1), s	6.0	9.5				4.7	8.1
Green Ext Time (p_c), s	0.2	2.9				3.0	0.6

Intersection Summary		
HCM 7th Control Delay, s/veh	12.6	
HCM 7th LOS	B	

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	20	60	10	10	50	90	30	10	310	60	30	270
Future Volume (vph)	20	60	10	10	50	90	30	10	310	60	30	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0		400		0	200		132	200	
Storage Lanes	1		0		1		0	1		0	1	
Taper Length (ft)	25				25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978				0.962			0.976			0.985
Flt Protected	0.950				0.950			0.950			0.950	
Satd. Flow (prot)	1770	1822	0	0	1770	1792	0	1770	1818	0	1770	1835
Flt Permitted	0.950				0.950			0.950			0.950	
Satd. Flow (perm)	1770	1822	0	0	1770	1792	0	1770	1818	0	1770	1835
Right Turn on Red			Yes				Yes			Yes		
Satd. Flow (RTOR)		11				26			15			9
Link Speed (mph)		40				40			40			40
Link Distance (ft)		290				615			346			357
Travel Time (s)		4.9				10.5			5.9			6.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	76	0	0	65	131	0	11	402	0	33	326
Turn Type	Prot	NA		Prot	Prot	NA		Prot	NA		Prot	NA
Protected Phases	7	4		3	3	8		5	2		1	6
Permitted Phases												
Detector Phase	7	4		3	3	8		5	2		1	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	9.5	22.5		9.5	22.5		9.5	22.5
Total Split (s)	9.5	22.5		9.6	9.6	22.6		9.5	23.4		9.5	23.4
Total Split (%)	14.6%	34.6%		14.8%	14.8%	34.8%		14.6%	36.0%		14.6%	36.0%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0		1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lead	Lag		Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes
Recall Mode	None	None		None	None	None		None	Min		None	Min
Act Effct Green (s)	5.8	8.2			5.9	11.8		5.8	24.4		5.8	25.8
Actuated g/C Ratio	0.14	0.20			0.15	0.29		0.14	0.60		0.14	0.64
v/c Ratio	0.09	0.20			0.25	0.24		0.04	0.37		0.13	0.28
Control Delay (s/veh)	24.0	17.5			24.7	13.4		23.6	13.2		24.0	10.6
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0		0.0	0.0
Total Delay (s/veh)	24.0	17.5			24.7	13.4		23.6	13.2		24.0	10.6
LOS	C	B			C	B		C	B		C	B
Approach Delay (s/veh)		19.0				17.1			13.5			11.9
Approach LOS		B				B			B			B
Queue Length 50th (ft)	4	12			13	13		2	67		7	52
Queue Length 95th (ft)	26	49			55	73		17	#205		34	162
Internal Link Dist (ft)		210				535			266			277

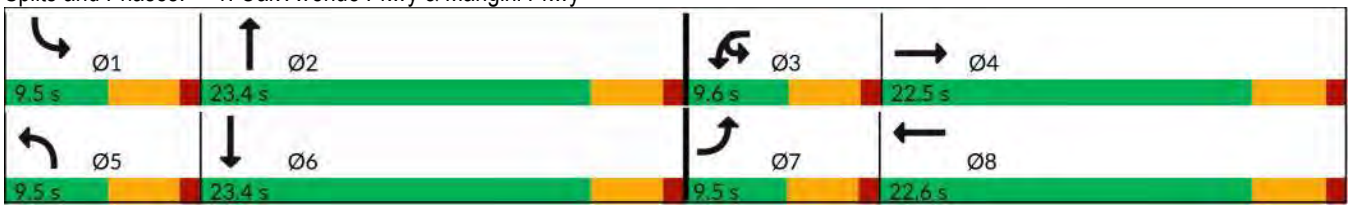
Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	30
Future Volume (vph)	30
Ideal Flow (vphpl)	1900
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	1.00
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.92
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
LOS	
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Turn Bay Length (ft)	150				400			200			200	
Base Capacity (vph)	253	946			258	942		253	1095		253	1166
Starvation Cap Reductn	0	0			0	0		0	0		0	0
Spillback Cap Reductn	0	0			0	0		0	0		0	0
Storage Cap Reductn	0	0			0	0		0	0		0	0
Reduced v/c Ratio	0.09	0.08			0.25	0.14		0.04	0.37		0.13	0.28

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 40.5			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.37			
Intersection Signal Delay (s/veh): 14.1		Intersection LOS: B	
Intersection Capacity Utilization 42.4%		ICU Level of Service A	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Oak Avenue Pkwy & Mangini Pkwy



Lane Group	SBR
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	20	60	10	10	50	90	30	10	310	60	30	270
Future Volume (veh/h)	20	60	10	10	50	90	30	10	310	60	30	270
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No				No			No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870		1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	65	11		54	98	33	11	337	65	33	293
Peak Hour Factor	0.92	0.92	0.92		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	49	190	32		102	204	69	26	452	87	69	530
Arrive On Green	0.03	0.12	0.12		0.06	0.15	0.15	0.01	0.30	0.30	0.04	0.32
Sat Flow, veh/h	1781	1559	264		1781	1339	451	1781	1524	294	1781	1651
Grp Volume(v), veh/h	22	0	76		54	0	131	11	0	402	33	0
Grp Sat Flow(s),veh/h/ln	1781	0	1823		1781	0	1789	1781	0	1817	1781	0
Q Serve(g_s), s	0.5	0.0	1.4		1.1	0.0	2.5	0.2	0.0	7.4	0.7	0.0
Cycle Q Clear(g_c), s	0.5	0.0	1.4		1.1	0.0	2.5	0.2	0.0	7.4	0.7	0.0
Prop In Lane	1.00		0.14		1.00		0.25	1.00		0.16	1.00	
Lane Grp Cap(c), veh/h	49	0	222		102	0	272	26	0	539	69	0
V/C Ratio(X)	0.45	0.00	0.34		0.53	0.00	0.48	0.43	0.00	0.75	0.48	0.00
Avail Cap(c_a), veh/h	240	0	885		245	0	873	240	0	926	240	0
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00		1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.8	0.0	14.9		17.0	0.0	14.4	18.1	0.0	11.8	17.5	0.0
Incr Delay (d2), s/veh	6.4	0.0	0.9		4.1	0.0	1.3	10.8	0.0	2.1	5.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.5		0.5	0.0	0.9	0.2	0.0	2.3	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	24.2	0.0	15.8		21.1	0.0	15.7	29.0	0.0	13.9	22.5	0.0
LnGrp LOS	C		B		C		B	C		B	C	
Approach Vol, veh/h		98				185			413			359
Approach Delay, s/veh		17.7				17.3			14.3			12.3
Approach LOS		B				B			B			B

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.9	15.5	6.6	9.0	5.0	16.4	5.5	10.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	18.9	5.1	18.0	5.0	18.9	5.0	18.1
Max Q Clear Time (g_c+I1), s	2.7	9.4	3.1	3.4	2.2	7.4	2.5	4.5
Green Ext Time (p_c), s	0.0	1.6	0.0	0.2	0.0	1.3	0.0	0.5

Intersection Summary	
HCM 7th Control Delay, s/veh	14.4
HCM 7th LOS	B

Notes

User approved ignoring U-Turning movement.

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	30
Future Volume (veh/h)	30
Initial Q (Qb), veh	0
Lane Width Adj.	1.00
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1870
Adj Flow Rate, veh/h	33
Peak Hour Factor	0.92
Percent Heavy Veh, %	2
Cap, veh/h	60
Arrive On Green	0.32
Sat Flow, veh/h	186
Grp Volume(v), veh/h	326
Grp Sat Flow(s),veh/h/ln	1837
Q Serve(g_s), s	5.4
Cycle Q Clear(g_c), s	5.4
Prop In Lane	0.10
Lane Grp Cap(c), veh/h	589
V/C Ratio(X)	0.55
Avail Cap(c_a), veh/h	936
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	10.4
Incr Delay (d2), s/veh	0.8
Initial Q Delay(d3), s/veh	0.0
%ile BackOfQ(50%),veh/ln	1.6
Unsig. Movement Delay, s/veh	
LnGrp Delay(d), s/veh	11.2
LnGrp LOS	B
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	40	180	0	40	30	210	150	0	50	220	20
Future Volume (vph)	10	40	180	0	40	30	210	150	0	50	220	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		0	200		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.894			0.941						0.987	
Flt Protected		0.998					0.950			0.950		
Satd. Flow (prot)	0	1662	0	0	1753	0	1770	1863	0	1770	1839	0
Flt Permitted		0.998					0.950			0.950		
Satd. Flow (perm)	0	1662	0	0	1753	0	1770	1863	0	1770	1839	0
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		391			404			398			448	
Travel Time (s)		8.9			9.2			6.8			7.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	250	0	0	76	0	228	163	0	54	261	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 54.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	40	180	0	40	30	210	150	0	50	220	20
Future Vol, veh/h	10	40	180	0	40	30	210	150	0	50	220	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	43	196	0	43	33	228	163	0	54	239	22
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay, s/veh	11.9	10	12.5	12.7
HCM LOS	B	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	4%	0%	100%	0%
Vol Thru, %	0%	100%	17%	57%	0%	92%
Vol Right, %	0%	0%	78%	43%	0%	8%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	210	150	230	70	50	240
LT Vol	210	0	10	0	50	0
Through Vol	0	150	40	40	0	220
RT Vol	0	0	180	30	0	20
Lane Flow Rate	228	163	250	76	54	261
Geometry Grp	5	5	2	2	5	5
Degree of Util (X)	0.409	0.269	0.38	0.128	0.099	0.435
Departure Headway (Hd)	6.45	5.942	5.469	6.057	6.567	6
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	557	603	655	588	545	600
Service Time	4.198	3.69	3.523	4.129	4.318	3.75
HCM Lane V/C Ratio	0.409	0.27	0.382	0.129	0.099	0.435
HCM Control Delay, s/veh	13.6	10.9	11.9	10	10	13.3
HCM Lane LOS	B	B	B	A	A	B
HCM 95th-tile Q	2	1.1	1.8	0.4	0.3	2.2

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	220	580	10	220	600
Future Volume (vph)	10	220	580	10	220	600
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	0		0	200	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt		0.850	0.997			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3529	0	1770	3539
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1583	3529	0	1770	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		239	3			
Link Speed (mph)	30		45			45
Link Distance (ft)	415		281			280
Travel Time (s)	9.4		4.3			4.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	239	641	0	239	652
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	22.5	22.5	22.5		9.5	22.5
Total Split (s)	22.5	22.5	22.5		15.0	37.5
Total Split (%)	37.5%	37.5%	37.5%		25.0%	62.5%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	Min		None	Min
Act Effct Green (s)	7.0	7.0	13.3		10.0	28.0
Actuated g/C Ratio	0.16	0.16	0.30		0.23	0.63
v/c Ratio	0.04	0.53	0.60		0.59	0.29
Control Delay (s/veh)	17.1	8.1	15.9		25.2	4.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	17.1	8.1	15.9		25.2	4.2
LOS	B	A	B		C	A
Approach Delay (s/veh)	8.5		15.9			9.8
Approach LOS	A		B			A
Queue Length 50th (ft)	2	0	67		52	25
Queue Length 95th (ft)	13	46	125		#156	62
Internal Link Dist (ft)	335		201			200

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Turn Bay Length (ft)	100				200	
Base Capacity (vph)	735	797	1468		429	2696
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.01	0.30	0.44		0.56	0.24

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 44.1			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay (s/veh): 11.8		Intersection LOS: B	
Intersection Capacity Utilization 44.0%		ICU Level of Service A	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Street D & Prarie City Rd

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	220	580	10	220	600
Future Volume (veh/h)	10	220	580	10	220	600
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	239	630	11	239	652
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	349	311	983	17	306	2011
Arrive On Green	0.20	0.20	0.28	0.28	0.17	0.57
Sat Flow, veh/h	1781	1585	3667	62	1781	3647
Grp Volume(v), veh/h	11	239	313	328	239	652
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1859	1781	1777
Q Serve(g_s), s	0.2	5.4	5.9	5.9	4.9	3.7
Cycle Q Clear(g_c), s	0.2	5.4	5.9	5.9	4.9	3.7
Prop In Lane	1.00	1.00		0.03	1.00	
Lane Grp Cap(c), veh/h	349	311	489	511	306	2011
V/C Ratio(X)	0.03	0.77	0.64	0.64	0.78	0.32
Avail Cap(c_a), veh/h	848	754	846	885	495	3101
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.3	14.4	12.1	12.1	15.0	4.4
Incr Delay (d2), s/veh	0.0	4.0	1.4	1.3	4.3	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.9	1.7	1.8	1.8	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	12.3	18.4	13.5	13.4	19.3	4.5
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	250		641			891
Approach Delay, s/veh	18.1		13.4			8.4
Approach LOS	B		B			A

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	11.0	14.9				25.9	11.9
Change Period (Y+Rc), s	4.5	4.5				4.5	4.5
Max Green Setting (Gmax), s	10.5	18.0				33.0	18.0
Max Q Clear Time (g_c+I1), s	6.9	7.9				5.7	7.4
Green Ext Time (p_c), s	0.2	2.5				4.3	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	11.6
HCM 7th LOS	B

Appendix C

Roundabout SIDRA® Operational Analysis

MOVEMENT SUMMARY

Site: 2 [Int 2_Alt00_2025_AM (Site Folder: Opening Year 2025)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Oak Avenue Parkway NB															
3	L2	All MCs	5	2.0	5	2.0	0.043	3.6	LOS A	0.2	4.5	0.33	0.19	0.33	33.4
8	T1	All MCs	23	2.0	23	2.0	0.043	3.6	LOS A	0.2	4.5	0.33	0.19	0.33	34.1
18	R2	All MCs	20	2.0	20	2.0	0.043	3.6	LOS A	0.2	4.5	0.33	0.19	0.33	33.8
Approach			48	2.0	48	2.0	0.043	3.6	LOS A	0.2	4.5	0.33	0.19	0.33	33.9
East: Mangini Parkway WB															
1	L2	All MCs	40	2.0	40	2.0	0.096	3.4	LOS A	0.4	10.4	0.12	0.03	0.12	33.0
6	T1	All MCs	11	2.0	11	2.0	0.096	3.4	LOS A	0.4	10.4	0.12	0.03	0.12	33.6
16	R2	All MCs	75	2.0	75	2.0	0.096	3.4	LOS A	0.4	10.4	0.12	0.03	0.12	33.3
Approach			126	2.0	126	2.0	0.096	3.4	LOS A	0.4	10.4	0.12	0.03	0.12	33.2
North: Oak Avenue Parkway SB															
7	L2	All MCs	158	2.0	158	2.0	0.175	4.2	LOS A	0.9	21.7	0.19	0.07	0.19	31.8
4	T1	All MCs	65	2.0	65	2.0	0.175	4.2	LOS A	0.9	21.7	0.19	0.07	0.19	32.4
14	R2	All MCs	1	2.0	1	2.0	0.175	4.2	LOS A	0.9	21.7	0.19	0.07	0.19	32.1
Approach			224	2.0	224	2.0	0.175	4.2	LOS A	0.9	21.7	0.19	0.07	0.19	32.0
West: Mangini Parkway EB															
5	L2	All MCs	4	2.0	4	2.0	0.050	3.9	LOS A	0.2	5.2	0.39	0.25	0.39	33.3
2	T1	All MCs	32	2.0	32	2.0	0.050	3.9	LOS A	0.2	5.2	0.39	0.25	0.39	34.0
12	R2	All MCs	15	2.0	15	2.0	0.050	3.9	LOS A	0.2	5.2	0.39	0.25	0.39	33.7
Approach			51	2.0	51	2.0	0.050	3.9	LOS A	0.2	5.2	0.39	0.25	0.39	33.8
All Vehicles			449	2.0	449	2.0	0.175	3.9	LOS A	0.9	21.7	0.21	0.09	0.21	32.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 2 [Int 2_Alt00_2025_PM (Site Folder: Opening Year 2025)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Oak Avenue Parkway NB															
3	L2	All MCs	18	2.0	18	2.0	0.103	4.0	LOS A	0.5	11.6	0.30	0.16	0.30	33.1
8	T1	All MCs	72	2.0	72	2.0	0.103	4.0	LOS A	0.5	11.6	0.30	0.16	0.30	33.8
18	R2	All MCs	29	2.0	29	2.0	0.103	4.0	LOS A	0.5	11.6	0.30	0.16	0.30	33.5
Approach			120	2.0	120	2.0	0.103	4.0	LOS A	0.5	11.6	0.30	0.16	0.30	33.6
East: Mangini Parkway WB															
1u	U	All MCs	1	3.0	1	3.0	0.203	4.7	LOS A	0.9	24.0	0.24	0.11	0.24	32.8
1	L2	All MCs	30	2.0	30	2.0	0.203	4.6	LOS A	0.9	24.0	0.24	0.11	0.24	32.8
6	T1	All MCs	36	2.0	36	2.0	0.203	4.6	LOS A	0.9	24.0	0.24	0.11	0.24	33.5
16	R2	All MCs	184	2.0	184	2.0	0.203	4.6	LOS A	0.9	24.0	0.24	0.11	0.24	33.2
Approach			251	2.0	251	2.0	0.203	4.6	LOS A	0.9	24.0	0.24	0.11	0.24	33.2
North: Oak Avenue Parkway SB															
7	L2	All MCs	124	2.0	124	2.0	0.135	4.0	LOS A	0.6	15.7	0.23	0.10	0.23	31.8
4	T1	All MCs	39	2.0	39	2.0	0.135	4.0	LOS A	0.6	15.7	0.23	0.10	0.23	32.4
14	R2	All MCs	4	2.0	4	2.0	0.135	4.0	LOS A	0.6	15.7	0.23	0.10	0.23	32.1
Approach			167	2.0	167	2.0	0.135	4.0	LOS A	0.6	15.7	0.23	0.10	0.23	31.9
West: Mangini Parkway EB															
5	L2	All MCs	2	2.0	2	2.0	0.031	3.5	LOS A	0.1	3.2	0.33	0.18	0.33	33.6
2	T1	All MCs	21	2.0	21	2.0	0.031	3.5	LOS A	0.1	3.2	0.33	0.18	0.33	34.2
12	R2	All MCs	11	2.0	11	2.0	0.031	3.5	LOS A	0.1	3.2	0.33	0.18	0.33	33.9
Approach			34	2.0	34	2.0	0.031	3.5	LOS A	0.1	3.2	0.33	0.18	0.33	34.1
All Vehicles			572	2.0	572	2.0	0.203	4.2	LOS A	0.9	24.0	0.26	0.12	0.26	33.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 4 [Int 4_Alt00_2025_AM (Site Folder: Opening Year 2025)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Oak Avenue Parkway NB															
3	L2	All MCs	118	2.0	118	2.0	0.112	3.4	LOS A	0.5	13.1	0.10	0.02	0.10	31.7
8	T1	All MCs	2	2.0	2	2.0	0.112	3.4	LOS A	0.5	13.1	0.10	0.02	0.10	32.3
18	R2	All MCs	24	23.0	24	23.0	0.112	4.6	LOS A	0.5	13.1	0.10	0.02	0.10	31.6
Approach			145	5.5	145	5.5	0.112	3.6	LOS A	0.5	13.1	0.10	0.02	0.10	31.7
East: Street D WB															
1	L2	All MCs	67	1.0	67	1.0	0.098	3.8	LOS A	0.4	11.0	0.27	0.13	0.27	32.3
6	T1	All MCs	49	1.0	49	1.0	0.098	3.8	LOS A	0.4	11.0	0.27	0.13	0.27	32.9
16	R2	All MCs	1	1.0	1	1.0	0.098	3.8	LOS A	0.4	11.0	0.27	0.13	0.27	32.6
Approach			117	1.0	117	1.0	0.098	3.8	LOS A	0.4	11.0	0.27	0.13	0.27	32.5
North: Oak Avenue Parkway SB															
7	L2	All MCs	1	2.0	1	2.0	0.007	3.5	LOS A	0.0	0.7	0.35	0.18	0.35	33.4
4	T1	All MCs	4	2.0	4	2.0	0.007	3.5	LOS A	0.0	0.7	0.35	0.18	0.35	34.1
14	R2	All MCs	2	2.0	2	2.0	0.007	3.5	LOS A	0.0	0.7	0.35	0.18	0.35	33.8
Approach			8	2.0	8	2.0	0.007	3.5	LOS A	0.0	0.7	0.35	0.18	0.35	33.9
West: Street D EB															
5	L2	All MCs	1	2.0	1	2.0	0.071	3.4	LOS A	0.3	7.9	0.20	0.08	0.20	33.7
2	T1	All MCs	17	2.0	17	2.0	0.071	3.4	LOS A	0.3	7.9	0.20	0.08	0.20	34.4
12	R2	All MCs	71	2.0	71	2.0	0.071	3.4	LOS A	0.3	7.9	0.20	0.08	0.20	34.1
Approach			89	2.0	89	2.0	0.071	3.4	LOS A	0.3	7.9	0.20	0.08	0.20	34.1
All Vehicles			359	3.1	359	3.1	0.112	3.6	LOS A	0.5	13.1	0.18	0.07	0.18	32.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
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LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 4 [Int 4_Alt00_2025_PM (Site Folder: Opening Year 2025)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Oak Avenue Parkway NB															
3	L2	All MCs	109	2.0	109	2.0	0.151	4.0	LOS A	0.7	18.3	0.19	0.07	0.19	32.1
8	T1	All MCs	7	2.0	7	2.0	0.151	4.0	LOS A	0.7	18.3	0.19	0.07	0.19	32.8
18	R2	All MCs	77	2.0	77	2.0	0.151	4.0	LOS A	0.7	18.3	0.19	0.07	0.19	32.5
Approach			192	2.0	192	2.0	0.151	4.0	LOS A	0.7	18.3	0.19	0.07	0.19	32.3
East: Street D WB															
1	L2	All MCs	46	1.0	46	1.0	0.065	3.5	LOS A	0.3	7.1	0.26	0.12	0.26	32.4
6	T1	All MCs	32	1.0	32	1.0	0.065	3.5	LOS A	0.3	7.1	0.26	0.12	0.26	33.0
16	R2	All MCs	1	1.0	1	1.0	0.065	3.5	LOS A	0.3	7.1	0.26	0.12	0.26	32.7
Approach			78	1.0	78	1.0	0.065	3.5	LOS A	0.3	7.1	0.26	0.12	0.26	32.6
North: Oak Avenue Parkway SB															
7	L2	All MCs	1	2.0	1	2.0	0.007	3.3	LOS A	0.0	0.7	0.31	0.14	0.31	33.5
4	T1	All MCs	4	2.0	4	2.0	0.007	3.3	LOS A	0.0	0.7	0.31	0.14	0.31	34.2
14	R2	All MCs	2	2.0	2	2.0	0.007	3.3	LOS A	0.0	0.7	0.31	0.14	0.31	33.9
Approach			8	2.0	8	2.0	0.007	3.3	LOS A	0.0	0.7	0.31	0.14	0.31	34.0
West: Street D EB															
5	L2	All MCs	3	2.0	3	2.0	0.153	4.0	LOS A	0.7	18.6	0.18	0.06	0.18	33.4
2	T1	All MCs	54	2.0	54	2.0	0.153	4.0	LOS A	0.7	18.6	0.18	0.06	0.18	34.1
12	R2	All MCs	139	2.0	139	2.0	0.153	4.0	LOS A	0.7	18.6	0.18	0.06	0.18	33.8
Approach			197	2.0	197	2.0	0.153	4.0	LOS A	0.7	18.6	0.18	0.06	0.18	33.9
All Vehicles			475	1.8	475	1.8	0.153	3.9	LOS A	0.7	18.6	0.20	0.08	0.20	33.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 5 [Int 5_Alt01_2025_AM (Site Folder: Opening Year 2025)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Prairie City Road NB															
8	T1	All MCs	767	2.0	767	2.0	0.306	5.5	LOS A	1.6	40.4	0.26	0.11	0.26	33.7
18	R2	All MCs	15	2.0	15	2.0	0.306	5.5	LOS A	1.6	40.4	0.26	0.11	0.26	33.4
Approach			783	2.0	783	2.0	0.306	5.5	LOS A	1.6	40.4	0.26	0.11	0.26	33.7
East: Street D WB															
1	L2	All MCs	45	2.0	45	2.0	0.427	11.0	LOS B	2.1	53.9	0.68	0.70	0.91	30.2
16	R2	All MCs	253	2.0	253	2.0	0.427	11.0	LOS B	2.1	53.9	0.68	0.70	0.91	30.5
Approach			298	2.0	298	2.0	0.427	11.0	LOS B	2.1	53.9	0.68	0.70	0.91	30.4
North: Prairie City Road SB															
7	L2	All MCs	89	2.0	89	2.0	0.208	4.3	LOS A	1.0	24.9	0.16	0.05	0.16	32.8
4	T1	All MCs	467	2.0	467	2.0	0.208	4.3	LOS A	1.0	24.9	0.16	0.05	0.16	34.0
Approach			557	2.0	557	2.0	0.208	4.3	LOS A	1.0	24.9	0.16	0.05	0.16	33.8
All Vehicles			1637	2.0	1637	2.0	0.427	6.1	LOS A	2.1	53.9	0.30	0.20	0.35	33.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 5 [Int 5_Alt01_2025_PM (Site Folder: Opening Year 2025)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Prairie City Road NB															
8	T1	All MCs	624	2.0	624	2.0	0.317	6.5	LOS A	1.5	38.8	0.47	0.31	0.47	33.2
18	R2	All MCs	50	2.0	50	2.0	0.317	6.5	LOS A	1.5	38.8	0.47	0.31	0.47	32.9
Approach			674	2.0	674	2.0	0.317	6.5	LOS A	1.5	38.8	0.47	0.31	0.47	33.2
East: Street D WB															
1	L2	All MCs	29	2.0	29	2.0	0.249	7.2	LOS A	1.0	24.2	0.57	0.49	0.57	31.8
16	R2	All MCs	168	2.0	168	2.0	0.249	7.2	LOS A	1.0	24.2	0.57	0.49	0.57	32.1
Approach			198	2.0	198	2.0	0.249	7.2	LOS A	1.0	24.2	0.57	0.49	0.57	32.1
North: Prairie City Road SB															
7	L2	All MCs	285	2.0	285	2.0	0.344	5.4	LOS A	1.9	49.4	0.15	0.04	0.15	31.6
4	T1	All MCs	647	2.0	647	2.0	0.344	5.4	LOS A	1.9	49.4	0.15	0.04	0.15	33.3
Approach			932	2.0	932	2.0	0.344	5.4	LOS A	1.9	49.4	0.15	0.04	0.15	32.8
All Vehicles			1803	2.0	1803	2.0	0.344	6.0	LOS A	1.9	49.4	0.31	0.19	0.31	32.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 2 [Int 2_Alt00_2045_AM (Site Folder: Design Year 2045)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Oak Avenue Parkway NB															
3	L2	All MCs	11	2.0	11	2.0	0.277	5.7	LOS A	1.4	36.7	0.38	0.20	0.38	32.6
8	T1	All MCs	261	2.0	261	2.0	0.277	5.7	LOS A	1.4	36.7	0.38	0.20	0.38	33.2
18	R2	All MCs	43	2.0	43	2.0	0.277	5.7	LOS A	1.4	36.7	0.38	0.20	0.38	32.9
Approach			315	2.0	315	2.0	0.277	5.7	LOS A	1.4	36.7	0.38	0.20	0.38	33.2
East: Mangini Parkway WB															
1	L2	All MCs	65	2.0	65	2.0	0.141	4.8	LOS A	0.6	14.9	0.43	0.29	0.43	32.0
6	T1	All MCs	43	2.0	43	2.0	0.141	4.8	LOS A	0.6	14.9	0.43	0.29	0.43	32.6
16	R2	All MCs	33	2.0	33	2.0	0.141	4.8	LOS A	0.6	14.9	0.43	0.29	0.43	32.3
Approach			141	2.0	141	2.0	0.141	4.8	LOS A	0.6	14.9	0.43	0.29	0.43	32.3
North: Oak Avenue Parkway SB															
7	L2	All MCs	33	2.0	33	2.0	0.337	6.1	LOS A	1.9	48.9	0.35	0.17	0.35	32.3
4	T1	All MCs	348	2.0	348	2.0	0.337	6.1	LOS A	1.9	48.9	0.35	0.17	0.35	32.9
14	R2	All MCs	22	2.0	22	2.0	0.337	6.1	LOS A	1.9	48.9	0.35	0.17	0.35	32.6
Approach			402	2.0	402	2.0	0.337	6.1	LOS A	1.9	48.9	0.35	0.17	0.35	32.9
West: Mangini Parkway EB															
5	L2	All MCs	33	2.0	33	2.0	0.167	5.9	LOS A	0.7	18.1	0.54	0.41	0.54	32.0
2	T1	All MCs	98	2.0	98	2.0	0.167	5.9	LOS A	0.7	18.1	0.54	0.41	0.54	32.7
12	R2	All MCs	11	2.0	11	2.0	0.167	5.9	LOS A	0.7	18.1	0.54	0.41	0.54	32.4
Approach			141	2.0	141	2.0	0.167	5.9	LOS A	0.7	18.1	0.54	0.41	0.54	32.5
All Vehicles			1000	2.0	1000	2.0	0.337	5.8	LOS A	1.9	48.9	0.39	0.23	0.39	32.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 2 [Int 2_Alt00_2045_PM (Site Folder: Design Year 2045)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Oak Avenue Parkway NB															
3	L2	All MCs	11	2.0	11	2.0	0.350	6.3	LOS A	2.0	51.6	0.37	0.18	0.37	32.3
8	T1	All MCs	337	2.0	337	2.0	0.350	6.3	LOS A	2.0	51.6	0.37	0.18	0.37	32.9
18	R2	All MCs	65	2.0	65	2.0	0.350	6.3	LOS A	2.0	51.6	0.37	0.18	0.37	32.7
Approach			413	2.0	413	2.0	0.350	6.3	LOS A	2.0	51.6	0.37	0.18	0.37	32.9
East: Mangini Parkway WB															
1u	U	All MCs	11	2.0	11	2.0	0.207	5.8	LOS A	0.9	22.7	0.49	0.35	0.49	31.8
1	L2	All MCs	54	2.0	54	2.0	0.207	5.8	LOS A	0.9	22.7	0.49	0.35	0.49	31.8
6	T1	All MCs	98	2.0	98	2.0	0.207	5.8	LOS A	0.9	22.7	0.49	0.35	0.49	32.4
16	R2	All MCs	33	2.0	33	2.0	0.207	5.8	LOS A	0.9	22.7	0.49	0.35	0.49	32.2
Approach			196	2.0	196	2.0	0.207	5.8	LOS A	0.9	22.7	0.49	0.35	0.49	32.2
North: Oak Avenue Parkway SB															
7	L2	All MCs	33	2.0	33	2.0	0.318	6.2	LOS A	1.7	43.8	0.41	0.22	0.41	32.2
4	T1	All MCs	293	2.0	293	2.0	0.318	6.2	LOS A	1.7	43.8	0.41	0.22	0.41	32.9
14	R2	All MCs	33	2.0	33	2.0	0.318	6.2	LOS A	1.7	43.8	0.41	0.22	0.41	32.6
Approach			359	2.0	359	2.0	0.318	6.2	LOS A	1.7	43.8	0.41	0.22	0.41	32.8
West: Mangini Parkway EB															
5	L2	All MCs	22	2.0	22	2.0	0.109	5.1	LOS A	0.5	11.5	0.49	0.36	0.49	32.5
2	T1	All MCs	65	2.0	65	2.0	0.109	5.1	LOS A	0.5	11.5	0.49	0.36	0.49	33.1
12	R2	All MCs	11	2.0	11	2.0	0.109	5.1	LOS A	0.5	11.5	0.49	0.36	0.49	32.8
Approach			98	2.0	98	2.0	0.109	5.1	LOS A	0.5	11.5	0.49	0.36	0.49	32.9
All Vehicles			1065	2.0	1065	2.0	0.350	6.1	LOS A	2.0	51.6	0.42	0.24	0.42	32.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 4 [Int 4_Alt00_2045_AM (Site Folder: Design Year 2045)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Oak Avenue Parkway NB															
3	L2	All MCs	217	2.0	217	2.0	0.344	6.0	LOS A	2.0	51.8	0.30	0.13	0.30	31.4
8	T1	All MCs	207	2.0	207	2.0	0.344	6.0	LOS A	2.0	51.8	0.30	0.13	0.30	32.0
18	R2	All MCs	1	23.0	1	23.0	0.344	7.7	LOS A	2.0	51.8	0.30	0.13	0.30	31.2
Approach			425	2.1	425	2.1	0.344	6.0	LOS A	2.0	51.8	0.30	0.13	0.30	31.7
East: Street D WB															
1	L2	All MCs	1	1.0	1	1.0	0.130	5.5	LOS A	0.5	13.7	0.53	0.41	0.53	32.7
6	T1	All MCs	54	1.0	54	1.0	0.130	5.5	LOS A	0.5	13.7	0.53	0.41	0.53	33.4
16	R2	All MCs	54	1.0	54	1.0	0.130	5.5	LOS A	0.5	13.7	0.53	0.41	0.53	33.1
Approach			110	1.0	110	1.0	0.130	5.5	LOS A	0.5	13.7	0.53	0.41	0.53	33.2
North: Oak Avenue Parkway SB															
7	L2	All MCs	22	2.0	22	2.0	0.203	5.4	LOS A	0.9	24.0	0.45	0.29	0.45	32.6
4	T1	All MCs	174	2.0	174	2.0	0.203	5.4	LOS A	0.9	24.0	0.45	0.29	0.45	33.2
14	R2	All MCs	11	2.0	11	2.0	0.203	5.4	LOS A	0.9	24.0	0.45	0.29	0.45	32.9
Approach			207	2.0	207	2.0	0.203	5.4	LOS A	0.9	24.0	0.45	0.29	0.45	33.1
West: Street D EB															
5	L2	All MCs	33	2.0	33	2.0	0.208	5.1	LOS A	1.0	25.3	0.39	0.22	0.39	32.5
2	T1	All MCs	33	2.0	33	2.0	0.208	5.1	LOS A	1.0	25.3	0.39	0.22	0.39	33.2
12	R2	All MCs	163	2.0	163	2.0	0.208	5.1	LOS A	1.0	25.3	0.39	0.22	0.39	32.9
Approach			228	2.0	228	2.0	0.208	5.1	LOS A	1.0	25.3	0.39	0.22	0.39	32.9
All Vehicles			970	1.9	970	1.9	0.344	5.6	LOS A	2.0	51.8	0.38	0.22	0.38	32.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2 [Int 2_Alt00_2045_PM (Site Folder: Design Year 2045)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Oak Avenue Parkway NB															
3	L2	All MCs	11	2.0	11	2.0	0.350	6.3	LOS A	2.0	51.6	0.37	0.18	0.37	32.3
8	T1	All MCs	337	2.0	337	2.0	0.350	6.3	LOS A	2.0	51.6	0.37	0.18	0.37	32.9
18	R2	All MCs	65	2.0	65	2.0	0.350	6.3	LOS A	2.0	51.6	0.37	0.18	0.37	32.7
Approach			413	2.0	413	2.0	0.350	6.3	LOS A	2.0	51.6	0.37	0.18	0.37	32.9
East: Mangini Parkway WB															
1u	U	All MCs	11	2.0	11	2.0	0.207	5.8	LOS A	0.9	22.7	0.49	0.35	0.49	31.8
1	L2	All MCs	54	2.0	54	2.0	0.207	5.8	LOS A	0.9	22.7	0.49	0.35	0.49	31.8
6	T1	All MCs	98	2.0	98	2.0	0.207	5.8	LOS A	0.9	22.7	0.49	0.35	0.49	32.4
16	R2	All MCs	33	2.0	33	2.0	0.207	5.8	LOS A	0.9	22.7	0.49	0.35	0.49	32.2
Approach			196	2.0	196	2.0	0.207	5.8	LOS A	0.9	22.7	0.49	0.35	0.49	32.2
North: Oak Avenue Parkway SB															
7	L2	All MCs	33	2.0	33	2.0	0.318	6.2	LOS A	1.7	43.8	0.41	0.22	0.41	32.2
4	T1	All MCs	293	2.0	293	2.0	0.318	6.2	LOS A	1.7	43.8	0.41	0.22	0.41	32.9
14	R2	All MCs	33	2.0	33	2.0	0.318	6.2	LOS A	1.7	43.8	0.41	0.22	0.41	32.6
Approach			359	2.0	359	2.0	0.318	6.2	LOS A	1.7	43.8	0.41	0.22	0.41	32.8
West: Mangini Parkway EB															
5	L2	All MCs	22	2.0	22	2.0	0.109	5.1	LOS A	0.5	11.5	0.49	0.36	0.49	32.5
2	T1	All MCs	65	2.0	65	2.0	0.109	5.1	LOS A	0.5	11.5	0.49	0.36	0.49	33.1
12	R2	All MCs	11	2.0	11	2.0	0.109	5.1	LOS A	0.5	11.5	0.49	0.36	0.49	32.8
Approach			98	2.0	98	2.0	0.109	5.1	LOS A	0.5	11.5	0.49	0.36	0.49	32.9
All Vehicles			1065	2.0	1065	2.0	0.350	6.1	LOS A	2.0	51.6	0.42	0.24	0.42	32.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 5 [Int 5_Alt01_2045_AM (Site Folder: Design Year 2045)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Prairie City Road NB															
8	T1	All MCs	772	2.0	772	2.0	0.335	6.2	LOS A	1.7	43.7	0.39	0.22	0.39	33.4
18	R2	All MCs	11	2.0	11	2.0	0.335	6.2	LOS A	1.7	43.7	0.39	0.22	0.39	33.0
Approach			783	2.0	783	2.0	0.335	6.2	LOS A	1.7	43.7	0.39	0.22	0.39	33.3
East: Street D WB															
1	L2	All MCs	11	2.0	11	2.0	0.391	10.4	LOS B	1.8	45.9	0.66	0.67	0.84	30.6
16	R2	All MCs	261	2.0	261	2.0	0.391	10.4	LOS B	1.8	45.9	0.66	0.67	0.84	31.0
Approach			272	2.0	272	2.0	0.391	10.4	LOS B	1.8	45.9	0.66	0.67	0.84	31.0
North: Prairie City Road SB															
7	L2	All MCs	185	2.0	185	2.0	0.240	4.2	LOS A	1.2	30.3	0.07	0.01	0.07	32.3
4	T1	All MCs	478	2.0	478	2.0	0.240	4.2	LOS A	1.2	30.3	0.07	0.01	0.07	33.9
Approach			663	2.0	663	2.0	0.240	4.2	LOS A	1.2	30.3	0.07	0.01	0.07	33.5
All Vehicles			1717	2.0	1717	2.0	0.391	6.1	LOS A	1.8	45.9	0.31	0.21	0.34	33.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
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Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 5 [Int 5_Alt01_2045_PM (Site Folder: Design Year 2045)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Prairie City Road NB															
8	T1	All MCs	630	2.0	630	2.0	0.289	6.0	LOS A	1.4	35.0	0.42	0.26	0.42	33.5
18	R2	All MCs	11	2.0	11	2.0	0.289	6.0	LOS A	1.4	35.0	0.42	0.26	0.42	33.2
Approach			641	2.0	641	2.0	0.289	6.0	LOS A	1.4	35.0	0.42	0.26	0.42	33.5
East: Street D WB															
1	L2	All MCs	11	2.0	11	2.0	0.317	8.2	LOS A	1.3	32.2	0.60	0.52	0.60	31.6
16	R2	All MCs	239	2.0	239	2.0	0.317	8.2	LOS A	1.3	32.2	0.60	0.52	0.60	32.0
Approach			250	2.0	250	2.0	0.317	8.2	LOS A	1.3	32.2	0.60	0.52	0.60	31.9
North: Prairie City Road SB															
7	L2	All MCs	239	2.0	239	2.0	0.323	4.7	LOS A	1.8	45.6	0.08	0.01	0.08	32.1
4	T1	All MCs	652	2.0	652	2.0	0.323	4.7	LOS A	1.8	45.6	0.08	0.01	0.08	33.6
Approach			891	2.0	891	2.0	0.323	4.7	LOS A	1.8	45.6	0.08	0.01	0.08	33.2
All Vehicles			1783	2.0	1783	2.0	0.323	5.7	LOS A	1.8	45.6	0.28	0.17	0.28	33.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
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Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
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Appendix D

HSM Predictive Method Safety Analysis and IHSDM KABCO Values

Mangini Pkwy at Oak Ave Pkwy		Total	CMF		K	A	B	C	O
2025	SSSC	0.58	-	-	0.77%	1.80%	8.89%	24.45%	64.08%
					0.0045	0.0105	0.0516	0.1420	0.3721
	AWSC	0.31	KABC	PDO	0.54%	1.26%	6.25%	17.17%	74.77%
			0.276	0.459	0.0017	0.0039	0.0194	0.0533	0.2321
	Signal	0.50	-		0.88%	2.05%	10.13%	27.86%	59.07%
					0.0044	0.0103	0.0508	0.1397	0.2961
	Roundabout	0.46	KABC	PDO	0.38%	0.88%	4.34%	11.92%	82.49%
			0.390	1.030	0.0018	0.0041	0.0201	0.0554	0.3832
2045	SSSC	0.87	-	-	0.81%	1.89%	9.35%	25.71%	62.24%
					0.0071	0.0166	0.0818	0.2249	0.5445
	AWSC	0.47	KABC	PDO	0.57%	1.33%	6.57%	18.05%	73.48%
			0.276	0.464	0.0027	0.0062	0.0307	0.0844	0.3436
	Signal	0.83	-		0.80%	1.86%	9.20%	25.29%	62.85%
					0.0066	0.0154	0.0761	0.2093	0.5203
	Roundabout	0.70	KABC	PDO	0.60%	1.39%	6.87%	18.88%	122.93%
			0.390	1.049	0.0028	0.0065	0.0319	0.0877	0.5711

Oak Ave Pkwy at St D		Total	CMF		K	A	B	C	O
2025	SSSC	0.51	-	-	0.76%	1.78%	8.78%	24.15%	64.52%
					0.0039	0.0090	0.0447	0.1229	0.3284
	AWSC	0.27	KABC	PDO	0.47%	1.09%	5.41%	14.87%	65.81%
			0.276	0.457	0.0015	0.0034	0.0168	0.0461	0.2043
	Signal	0.54	-		0.76%	1.77%	8.74%	24.03%	64.70%
					0.0041	0.0095	0.0471	0.1295	0.3488
	Roundabout	0.41	KABC	PDO	0.33%	0.76%	3.75%	10.32%	72.49%
			0.390	1.025	0.0015	0.0035	0.0174	0.0479	0.3368
2045	SSSC	1.01	-	-	0.83%	1.92%	9.48%	26.06%	61.71%
					0.0083	0.0193	0.0955	0.2625	0.6217
	AWSC	0.54	KABC	PDO	0.67%	1.55%	7.66%	21.08%	84.19%
			0.276	0.466	0.0031	0.0073	0.0358	0.0985	0.3937
	Signal	1.28	-		0.73%	1.69%	8.37%	23.01%	66.19%
					0.0093	0.0217	0.1072	0.2948	0.8480
	Roundabout	0.81	KABC	PDO	0.70%	1.62%	8.02%	22.04%	141.10%
			0.390	1.054	0.0032	0.0075	0.0372	0.1024	0.6555

Prairie City Rd at St D		Total	CMF		K	A	B	C	O
2025	Signal	1.77	-		0.77%	1.80%	8.87%	24.39%	64.16%
					0.0137	0.0318	0.1573	0.4325	1.1376
	Roundabout	1.50	KABC	PDO	1.15%	2.67%	13.21%	36.31%	269.37%
			0.288	1.100	0.0053	0.0124	0.0613	0.1687	1.2513
2045	Signal	1.78	-		0.77%	1.80%	8.90%	24.46%	64.07%
					0.0138	0.0321	0.1585	0.4359	1.1416
	Roundabout	1.51	KABC	PDO	1.16%	2.69%	13.31%	36.59%	270.61%
			0.288	1.101	0.0054	0.0125	0.0618	0.1700	1.2571

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

March 21, 2025

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Report Overview

Report Generated: Mar 21, 2025 1:03 PM
Report Template: System: Multi-Page [System] (sscpm2, Jul 23, 2021 4:16 PM)

Evaluation Date: Fri Mar 21 10:15:57 PDT 2025
IHSDM Version: v17.0.0 (Sep 22, 2021)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: kendra.lolland
Organization Name:
Phone:
E-Mail:

Project Title: Folsom Toll_Oak ave and Mangini Pkwy
Project Comment: Created Tue Mar 18 11:18:47 PDT 2025
Project Unit System: U.S. Customary

Site Set: SSSC
Site Set Comment: Created Thu Mar 20 14:08:06 PDT 2025
Site Set Version: v1

Evaluation Title: Mangini Pkwy_Oak Ave Pkwy_SSSC_2025
Evaluation Comment: Created Fri Mar 21 10:12:46 PDT 2025
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration

First Year of Analysis: 2025
Last Year of Analysis: 2025
Empirical-Bayes Analysis: None

Disclaimer Regarding Crash Prediction Method

IMPORTANT NOTICE ABOUT COMPARING RESULTS FROM HIGHWAY SAFETY MANUAL FIRST EDITION (2010) MODELS TO RESULTS FROM NEW MODELS DEVELOPED UNDER NCHRP PROJECTS 17-70, 17-58, AND 17-68

Since the publication of the Highway Safety Manual - First Edition (HSM-1), in 2010 by the American Association of State Highway and Transportation Officials (AASHTO), multiple research efforts have been undertaken through the National

Cooperative Highway Research Program (NCHRP) to develop safety performance models for road segment and intersection facility types that were not initially reflected in the HSM-1, in order to expand the breadth and depth of the HSM in the future.

The IHSDM Crash Prediction Module (CPM) is intended as a faithful implementation of HSM Part C predictive methods. As NCHRP projects to develop new predictive methods for the HSM are completed, FHWA works to incorporate the new methods into IHSDM, sometimes in advance of publication in the HSM. The following new crash predictive methods have been accepted by NCHRP project panels and incorporated into IHSDM, while pending AASHTO's approval for incorporation into a future edition of the HSM:

- Roundabouts: completed in 2018 under NCHRP Project 17-70, the new methods will provide improved outcomes for the safety analysis of roundabouts.
- 6+ lane and one-way urban/suburban arterials (including models for segments and intersections): completed under NCHRP Project 17-58.
- Intersection crash prediction methods for some intersection configurations and traffic control types not currently addressed in the HSM (e.g., all-way stop; rural 3-leg signalized; 3-leg stop-controlled where the major leg turns; urban 5-leg signalized; urban high-speed intersections): completed in 2021 under NCHRP Project 17-68.

However, in the absence of local calibration factors (see HSM-1 Part C, Appendix A for guidance on calibration of the predictive models), it is neither appropriate nor advisable to directly compare the results from new models (from NCHRP Projects 17-58, 17-68, and 17-70) to results from HSM-1 models, as the models were not calibrated to the same base state data sets, and consequently can produce unexpected results. If local calibration factors are available and applied to both new models and HSM-1 models, then it may be appropriate to directly compare the results.*[Note: Work being performed under NCHRP Project 17-72 (Update of Crash Modification Factors for the Highway Safety Manual) is expected to re-calibrate many of the old (HSM-1) and new (e.g., NCHRP 17-70) models to data from a single (or small number of) states, that would allow results from all models to be directly compared.]*

The models produced for NCHRP Project 17-70 have independent value in terms of informing the design of a roundabout and assessing the effects of different design characteristics on the expected safety performance of a roundabout.

The HSM-1 interim method previously included in IHSDM for evaluating roundabouts on urban/suburban arterials (i.e., evaluating an existing intersection and then applying a Crash Modification Factor for replacing the existing intersection with a roundabout) has been deactivated in IHSDM, to minimize any confusion with the new roundabout methodology.

Section Types

Urban Arterial Site Set CPM Evaluation

Site Type

Type: 4ST
Calibration Factor: 1

Table 1. Evaluation and Crash Data (CSD) (if applicable) Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting
1	4ST2x2le5	Mangini Pkwy	at Oak Ave Pkwy	2025: 3920	2025: 3910	2	0	yes

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Travel Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	4ST	Mangini Pkwy	at Oak Ave Pkwy	0.581	0.5807	0.2086	0.3721	0.20	0.5807
		Total	Total	0.581	0.5807	0.2086	0.3721	0.20	0.5807

Table 3. Predicted Crash Frequencies by Year (4ST)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2025	0.58	0.21	35.925	0.37	64.075
Total	0.58	0.21	35.925	0.37	64.075
Average	0.58	0.21	35.925	0.37	64.075

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the

distribution of these three crashes had been derived independently.

Table 4. Predicted 4ST Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.3	0.00	0.3
Intersection	Collision with Bicycle	0.01	1.7	0.00	0.0	0.01	1.7
Intersection	Collision with Fixed Object	0.02	3.3	0.06	10.0	0.08	13.3
Intersection	Non-Collision	0.01	0.9	0.00	0.6	0.01	1.5
Intersection	Collision with Other Object	0.00	0.4	0.01	0.8	0.01	1.3
Intersection	Other Single-vehicle Collision	0.00	0.2	0.00	0.1	0.00	0.3
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.01	2.1	0.00	0.0	0.01	2.1
Intersection	Total Intersection Single Vehicle Crashes	0.05	8.7	0.07	11.8	0.12	20.6
Intersection	Angle Collision	0.07	12.0	0.10	17.5	0.17	29.5
Intersection	Head-on Collision	0.01	1.1	0.01	1.6	0.02	2.7
Intersection	Other Multi-vehicle Collision	0.01	1.6	0.07	11.3	0.07	13.0
Intersection	Rear-end Collision	0.05	9.2	0.11	19.5	0.17	28.7
Intersection	Sideswipe	0.02	3.3	0.01	2.3	0.03	5.6
Intersection	Total Intersection Multiple Vehicle Crashes	0.16	27.2	0.30	52.2	0.46	79.5
Intersection	Total Intersection Crashes	0.21	35.9	0.37	64.1	0.58	100.0
	Total Crashes	0.21	35.9	0.37	64.1	0.58	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

March 21, 2025

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Report Overview

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Report Template: System: Multi-Page [System] (sscpm2, Jul 23, 2021 4:16 PM)

Evaluation Date: Fri Mar 21 12:46:36 PDT 2025
IHSDM Version: v17.0.0 (Sep 22, 2021)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: kendra.lolland
Organization Name:
Phone:
E-Mail:

Project Title: Folsom Toll_Oak ave and Mangini Pkwy
Project Comment: Created Tue Mar 18 11:18:47 PDT 2025
Project Unit System: U.S. Customary

Site Set: SSSC
Site Set Comment: Created Thu Mar 20 14:08:06 PDT 2025
Site Set Version: v1

Evaluation Title: Mangini Pkwy_Oak Ave Pkwy_SSSC_2045
Evaluation Comment: Created Fri Mar 21 12:44:50 PDT 2025
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration

First Year of Analysis: 2045
Last Year of Analysis: 2045
Empirical-Bayes Analysis: None

Disclaimer Regarding Crash Prediction Method

IMPORTANT NOTICE ABOUT COMPARING RESULTS FROM HIGHWAY SAFETY MANUAL FIRST EDITION (2010) MODELS TO RESULTS FROM NEW MODELS DEVELOPED UNDER NCHRP PROJECTS 17-70, 17-58, AND 17-68

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However, in the absence of local calibration factors (see HSM-1 Part C, Appendix A for guidance on calibration of the predictive models), it is neither appropriate nor advisable to directly compare the results from new models (from NCHRP Projects 17-58, 17-68, and 17-70) to results from HSM-1 models, as the models were not calibrated to the same base state data sets, and consequently can produce unexpected results. If local calibration factors are available and applied to both new models and HSM-1 models, then it may be appropriate to directly compare the results.*[Note: Work being performed under NCHRP Project 17-72 (Update of Crash Modification Factors for the Highway Safety Manual) is expected to re-calibrate many of the old (HSM-1) and new (e.g., NCHRP 17-70) models to data from a single (or small number of) states, that would allow results from all models to be directly compared.]*

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Section Types

Urban Arterial Site Set CPM Evaluation

Site Type

Type: 4ST
Calibration Factor: 1

Table 1. Evaluation and Crash Data (CSD) (if applicable) Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting
1	4ST2x2le5	Mangini Pkwy	at Oak Ave Pkwy	2045: 7100	2045: 3400	2	0	yes

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Travel Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	4ST	Mangini Pkwy	at Oak Ave Pkwy	0.875	0.8748	0.3304	0.5445	0.23	0.8748
		Total	Total	0.875	0.8748	0.3304	0.5445	0.23	0.8748

Table 3. Predicted Crash Frequencies by Year (4ST)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2045	0.88	0.33	37.765	0.54	62.235
Total	0.88	0.33	37.765	0.54	62.235
Average	0.88	0.33	37.765	0.54	62.235

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the

distribution of these three crashes had been derived independently.

Table 4. Predicted 4ST Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.2	0.00	0.2
Intersection	Collision with Bicycle	0.01	1.7	0.00	0.0	0.01	1.7
Intersection	Collision with Fixed Object	0.02	2.6	0.07	8.0	0.09	10.6
Intersection	Non-Collision	0.01	0.7	0.00	0.5	0.01	1.2
Intersection	Collision with Other Object	0.00	0.3	0.01	0.7	0.01	1.0
Intersection	Other Single-vehicle Collision	0.00	0.2	0.00	0.1	0.00	0.3
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.02	2.1	0.00	0.0	0.02	2.1
Intersection	Total Intersection Single Vehicle Crashes	0.07	7.7	0.08	9.4	0.15	17.1
Intersection	Angle Collision	0.12	13.2	0.15	17.7	0.27	30.9
Intersection	Head-on Collision	0.01	1.2	0.01	1.6	0.03	2.8
Intersection	Other Multi-vehicle Collision	0.02	1.8	0.10	11.5	0.12	13.3
Intersection	Rear-end Collision	0.09	10.2	0.17	19.8	0.26	29.9
Intersection	Sideswipe	0.03	3.6	0.02	2.3	0.05	6.0
Intersection	Total Intersection Multiple Vehicle Crashes	0.26	30.0	0.46	52.8	0.72	82.9
Intersection	Total Intersection Crashes	0.33	37.8	0.54	62.2	0.88	100.0
	Total Crashes	0.33	37.8	0.54	62.2	0.88	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

March 20, 2025

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Report Overview

Report Generated: Mar 20, 2025 3:22 PM
Report Template: System: Multi-Page [System] (sscpm2, Jul 23, 2021 4:16 PM)

Evaluation Date: Thu Mar 20 15:21:57 PDT 2025
IHSDM Version: v17.0.0 (Sep 22, 2021)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: kendra.lolland
Organization Name:
Phone:
E-Mail:

Project Title: Folsom Toll_Oak ave and Mangini Pkwy
Project Comment: Created Tue Mar 18 11:18:47 PDT 2025
Project Unit System: U.S. Customary

Site Set: Signal
Site Set Comment: Created Wed Mar 19 11:01:58 PDT 2025
Site Set Version: v1

Evaluation Title: Mangini Pkwy_Oak Ave_Signal_2025
Evaluation Comment: Created Thu Mar 20 15:21:37 PDT 2025
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration

First Year of Analysis: 2025
Last Year of Analysis: 2025
Empirical-Bayes Analysis: None

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Section Types

Urban Arterial Site Set CPM Evaluation

Site Type

Type: 4SG
Calibration Factor: 1

Table 1. Evaluation and Crash Data (CSD) (if applicable) Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Number of Approaches with Permissive Left-Turn Phasing	Number of Approaches with Permissive/Protected or Protected/Permissive Left-Turn Phasing	Number of Approaches with Protected Left-Turn Phasing	Number of Approaches on which Right Turn on Red is Prohibited	Presence of Red-Light Cameras	Pedestrian Volumes Crossing all Intersection Legs (crossings/day)	Max. Number of Lanes Crossed by Pedestrians	Number of Bus Stops within 1000 ft of Intersection	Number of Schools within 1000 ft of Intersection	Number of Alcohol Sales Establishments within 1000 ft of Intersection
1	4SG2x2le5	Mangini Pkwy	at Oak Ave Pkwy	2025: 3920	2025: 3910	4	0	yes	0	0	4	0	no	700	4	0	2	0

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Travel Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	4SG	Mangini Pkwy	at Oak Ave Pkwy	0.501	0.5013	0.2052	0.2961	0.18	0.5013
		Total	Total	0.501	0.5013	0.2052	0.2961	0.18	0.5013

Table 3. Predicted Crash Frequencies by Year (4SG)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2025	0.50	0.20	40.934	0.30	59.066
Total	0.50	0.20	40.934	0.30	59.066
Average	0.50	0.20	40.934	0.30	59.066

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived

independently.

Table 4. Predicted 4SG Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Bicycle	0.01	1.2	0.00	0.0	0.01	1.2
Intersection	Collision with Fixed Object	0.01	2.5	0.02	4.8	0.04	7.3
Intersection	Non-Collision	0.00	0.5	0.00	0.2	0.00	0.7
Intersection	Collision with Other Object	0.00	0.2	0.00	0.4	0.00	0.6
Intersection	Other Single-vehicle Collision	0.00	0.1	0.00	0.1	0.00	0.3
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.08	15.8	0.00	0.0	0.08	15.8
Intersection	Total Intersection Single Vehicle Crashes	0.10	20.5	0.03	5.5	0.13	26.0
Intersection	Angle Collision	0.04	7.1	0.07	13.1	0.10	20.2
Intersection	Head-on Collision	0.01	1.0	0.01	1.6	0.01	2.6
Intersection	Other Multi-vehicle Collision	0.01	1.1	0.06	11.3	0.06	12.4
Intersection	Rear-end Collision	0.05	9.2	0.13	25.9	0.18	35.1
Intersection	Sideswipe	0.01	2.0	0.01	1.7	0.02	3.7
Intersection	Total Intersection Multiple Vehicle Crashes	0.10	20.5	0.27	53.6	0.37	74.0
Intersection	Total Intersection Crashes	0.20	40.9	0.30	59.1	0.50	100.0
	Total Crashes	0.20	40.9	0.30	59.1	0.50	100.0

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Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

March 20, 2025

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Report Overview

Report Generated: Mar 20, 2025 3:22 PM
Report Template: System: Multi-Page [System] (sscpm2, Jul 23, 2021 4:16 PM)

Evaluation Date: Thu Mar 20 15:07:27 PDT 2025
IHSDM Version: v17.0.0 (Sep 22, 2021)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: kendra.lolland
Organization Name:
Phone:
E-Mail:

Project Title: Folsom Toll_Oak ave and Mangini Pkwy
Project Comment: Created Tue Mar 18 11:18:47 PDT 2025
Project Unit System: U.S. Customary

Site Set: Signal
Site Set Comment: Created Wed Mar 19 11:01:58 PDT 2025
Site Set Version: v1

Evaluation Title: Mangini Pkwy_Oak Ave_Signal_2045
Evaluation Comment: Created Thu Mar 20 15:07:09 PDT 2025
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration

First Year of Analysis: 2045
Last Year of Analysis: 2045
Empirical-Bayes Analysis: None

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Section Types

Urban Arterial Site Set CPM Evaluation

Site Type

Type: 4SG
Calibration Factor: 1

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Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Number of Approaches with Permissive Left-Turn Phasing	Number of Approaches with Permissive/Protected or Protected/Permissive Left-Turn Phasing	Number of Approaches with Protected Left-Turn Phasing	Number of Approaches on which Right Turn on Red is Prohibited	Presence of Red-Light Cameras	Pedestrian Volumes Crossing all Intersection Legs (crossings/day)	Max. Number of Lanes Crossed by Pedestrians	Number of Bus Stops within 1000 ft of Intersection	Number of Schools within 1000 ft of Intersection	Number of Alcohol Sales Establishments within 1000 ft of Intersection
1	4SG2x2le5	Mangini Pkwy	at Oak Ave Pkwy	2045: 7100	2045: 3400	4	0	yes	0	0	4	0	no	700	4	0	2	0

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Travel Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	4SG	Mangini Pkwy	at Oak Ave Pkwy	0.828	0.8278	0.3075	0.5203	0.22	0.8278
		Total	Total	0.828	0.8278	0.3075	0.5203	0.22	0.8278

Table 3. Predicted Crash Frequencies by Year (4SG)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2045	0.83	0.31	37.148	0.52	62.852
Total	0.83	0.31	37.148	0.52	62.852
Average	0.83	0.31	37.148	0.52	62.852

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived

independently.

Table 4. Predicted 4SG Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Bicycle	0.01	1.3	0.00	0.0	0.01	1.3
Intersection	Collision with Fixed Object	0.02	1.9	0.04	4.5	0.05	6.5
Intersection	Non-Collision	0.00	0.4	0.00	0.2	0.01	0.5
Intersection	Collision with Other Object	0.00	0.2	0.00	0.4	0.01	0.6
Intersection	Other Single-vehicle Collision	0.00	0.1	0.00	0.1	0.00	0.2
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.07	8.9	0.00	0.0	0.07	8.9
Intersection	Total Intersection Single Vehicle Crashes	0.11	12.8	0.04	5.2	0.15	18.0
Intersection	Angle Collision	0.07	8.4	0.12	14.1	0.19	22.5
Intersection	Head-on Collision	0.01	1.2	0.01	1.7	0.02	2.9
Intersection	Other Multi-vehicle Collision	0.01	1.3	0.10	12.2	0.11	13.5
Intersection	Rear-end Collision	0.09	10.9	0.23	27.9	0.32	38.8
Intersection	Sideswipe	0.02	2.4	0.01	1.8	0.04	4.3
Intersection	Total Intersection Multiple Vehicle Crashes	0.20	24.3	0.48	57.7	0.68	82.0
Intersection	Total Intersection Crashes	0.31	37.1	0.52	62.9	0.83	100.0
	Total Crashes	0.31	37.1	0.52	62.9	0.83	100.0

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Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

March 21, 2025

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Report Overview

Report Generated: Mar 21, 2025 1:39 PM
Report Template: System: Multi-Page [System] (sscpm2, Jul 23, 2021 4:16 PM)

Evaluation Date: Fri Mar 21 13:32:24 PDT 2025
IHSDM Version: v17.0.0 (Sep 22, 2021)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: kendra.lolland
Organization Name:
Phone:
E-Mail:

Project Title: Folsom Toll_Oak Ave and Street D
Project Comment: Created Tue Mar 18 11:18:23 PDT 2025
Project Unit System: U.S. Customary

Site Set: SSSC
Site Set Comment: Created Fri Mar 21 13:27:13 PDT 2025
Site Set Version: v1

Evaluation Title: Oak Ave Pkwy_D St_SSSC_2025
Evaluation Comment: Created Fri Mar 21 13:30:42 PDT 2025
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration

First Year of Analysis: 2025
Last Year of Analysis: 2025
Empirical-Bayes Analysis: None

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- Intersection crash prediction methods for some intersection configurations and traffic control types not currently addressed in the HSM (e.g., all-way stop; rural 3-leg signalized; 3-leg stop-controlled where the major leg turns; urban 5-leg signalized; urban high-speed intersections): completed in 2021 under NCHRP Project 17-68.

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Section Types

Urban Arterial Site Set CPM Evaluation

Site Type

Type: 4ST
Calibration Factor: 1

Table 1. Evaluation and Crash Data (CSD) (if applicable) Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting
1	4ST2x2le5	Oak Ave Pkwy	at D St	2025: 3510	2025: 3120	2	0	yes

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Travel Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	4ST	Oak Ave Pkwy	at D St	0.509	0.5089	0.1806	0.3284	0.21	0.5089
		Total	Total	0.509	0.5089	0.1806	0.3284	0.21	0.5089

Table 3. Predicted Crash Frequencies by Year (4ST)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2025	0.51	0.18	35.478	0.33	64.522
Total	0.51	0.18	35.478	0.33	64.522
Average	0.51	0.18	35.478	0.33	64.522

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the

distribution of these three crashes had been derived independently.

Table 4. Predicted 4ST Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.3	0.00	0.3
Intersection	Collision with Bicycle	0.01	1.7	0.00	0.0	0.01	1.7
Intersection	Collision with Fixed Object	0.02	3.6	0.05	10.6	0.07	14.3
Intersection	Non-Collision	0.01	1.0	0.00	0.6	0.01	1.6
Intersection	Collision with Other Object	0.00	0.5	0.00	0.9	0.01	1.4
Intersection	Other Single-vehicle Collision	0.00	0.3	0.00	0.1	0.00	0.4
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.01	2.1	0.00	0.0	0.01	2.1
Intersection	Total Intersection Single Vehicle Crashes	0.05	9.2	0.06	12.5	0.11	21.7
Intersection	Angle Collision	0.06	11.6	0.09	17.4	0.15	29.0
Intersection	Head-on Collision	0.01	1.1	0.01	1.6	0.01	2.6
Intersection	Other Multi-vehicle Collision	0.01	1.6	0.06	11.3	0.07	12.9
Intersection	Rear-end Collision	0.04	8.9	0.10	19.4	0.14	28.3
Intersection	Sideswipe	0.02	3.2	0.01	2.3	0.03	5.5
Intersection	Total Intersection Multiple Vehicle Crashes	0.13	26.3	0.27	52.0	0.40	78.3
Intersection	Total Intersection Crashes	0.18	35.5	0.33	64.5	0.51	100.0
	Total Crashes	0.18	35.5	0.33	64.5	0.51	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

March 21, 2025

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Report Overview

Report Generated: Mar 21, 2025 1:40 PM
Report Template: System: Multi-Page [System] (sscpm2, Jul 23, 2021 4:16 PM)

Evaluation Date: Fri Mar 21 13:36:33 PDT 2025
IHSDM Version: v17.0.0 (Sep 22, 2021)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: kendra.lolland
Organization Name:
Phone:
E-Mail:

Project Title: Folsom Toll_Oak Ave and Street D
Project Comment: Created Tue Mar 18 11:18:23 PDT 2025
Project Unit System: U.S. Customary

Site Set: SSSC
Site Set Comment: Created Fri Mar 21 13:27:13 PDT 2025
Site Set Version: v1

Evaluation Title: Oak Ave Pkwy_D St_SSSC_2045
Evaluation Comment: Created Fri Mar 21 13:34:55 PDT 2025
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration

First Year of Analysis: 2045
Last Year of Analysis: 2045
Empirical-Bayes Analysis: None

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Section Types

Urban Arterial Site Set CPM Evaluation

Site Type

Type: 4ST
Calibration Factor: 1

Table 1. Evaluation and Crash Data (CSD) (if applicable) Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting
1	4ST2x2le5	Oak Ave Pkwy	at D St	2045: 7600	2045: 5000	2	0	yes

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Travel Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	4ST	Oak Ave Pkwy	at D St	1.007	1.0074	0.3857	0.6217	0.22	1.0074
		Total	Total	1.007	1.0074	0.3857	0.6217	0.22	1.0074

Table 3. Predicted Crash Frequencies by Year (4ST)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2045	1.01	0.39	38.285	0.62	61.715
Total	1.01	0.39	38.285	0.62	61.715
Average	1.01	0.39	38.285	0.62	61.715

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the

distribution of these three crashes had been derived independently.

Table 4. Predicted 4ST Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.2	0.00	0.2
Intersection	Collision with Bicycle	0.02	1.7	0.00	0.0	0.02	1.7
Intersection	Collision with Fixed Object	0.02	2.4	0.08	7.5	0.10	9.9
Intersection	Non-Collision	0.01	0.6	0.00	0.4	0.01	1.1
Intersection	Collision with Other Object	0.00	0.3	0.01	0.6	0.01	0.9
Intersection	Other Single-vehicle Collision	0.00	0.2	0.00	0.1	0.00	0.2
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.02	2.1	0.00	0.0	0.02	2.1
Intersection	Total Intersection Single Vehicle Crashes	0.07	7.3	0.09	8.9	0.16	16.2
Intersection	Angle Collision	0.14	13.6	0.18	17.7	0.32	31.3
Intersection	Head-on Collision	0.01	1.3	0.02	1.6	0.03	2.9
Intersection	Other Multi-vehicle Collision	0.02	1.9	0.12	11.5	0.13	13.3
Intersection	Rear-end Collision	0.10	10.5	0.20	19.8	0.30	30.2
Intersection	Sideswipe	0.04	3.7	0.02	2.3	0.06	6.1
Intersection	Total Intersection Multiple Vehicle Crashes	0.31	31.0	0.53	52.8	0.84	83.8
Intersection	Total Intersection Crashes	0.39	38.3	0.62	61.7	1.01	100.0
	Total Crashes	0.39	38.3	0.62	61.7	1.01	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

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Report Overview

Report Generated: Mar 21, 2025 1:56 PM
Report Template: System: Multi-Page [System] (sscpm2, Jul 23, 2021 4:16 PM)

Evaluation Date: Fri Mar 21 13:51:50 PDT 2025
IHSDM Version: v17.0.0 (Sep 22, 2021)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: kendra.lolland
Organization Name:
Phone:
E-Mail:

Project Title: Folsom Toll_Oak Ave and Street D
Project Comment: Created Tue Mar 18 11:18:23 PDT 2025
Project Unit System: U.S. Customary

Site Set: Signal
Site Set Comment: Created Wed Mar 19 10:26:21 PDT 2025
Site Set Version: v1

Evaluation Title: Oak Ave Pkwy_St D_SSSC_2025
Evaluation Comment: Created Fri Mar 21 13:49:43 PDT 2025
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration

First Year of Analysis: 2025
Last Year of Analysis: 2025
Empirical-Bayes Analysis: None

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Section Types

Urban Arterial Site Set CPM Evaluation

Site Type

Type: 4SG
Calibration Factor: 1

Table 1. Evaluation and Crash Data (CSD) (if applicable) Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Number of Approaches with Permissive Left-Turn Phasing	Number of Approaches with Permissive/Protected or Protected/Permissive Left-Turn Phasing	Number of Approaches with Protected Left-Turn Phasing	Number of Approaches on which Right Turn on Red is Prohibited	Presence of Red-Light Cameras	Pedestrian Volumes Crossing all Intersection Legs (crossings/day)	Max. Number of Lanes Crossed by Pedestrians	Number of Bus Stops within 1000 ft of Intersection	Number of Schools within 1000 ft of Intersection	Number of Alcohol Sales Establishments within 1000 ft of Intersection
1	4SG2x2le5	Oak Ave Pkwy	at D St	2025: 3510	2025: 3120	2	0	yes	0	0	2	0	no	240	3	0	1	0

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Travel Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	4SG	Oak Ave Pkwy	at D St	0.539	0.5391	0.1903	0.3488	0.22	0.5391
		Total	Total	0.539	0.5391	0.1903	0.3488	0.22	0.5391

Table 3. Predicted Crash Frequencies by Year (4SG)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2025	0.54	0.19	35.299	0.35	64.701
Total	0.54	0.19	35.299	0.35	64.701
Average	0.54	0.19	35.299	0.35	64.701

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived

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Table 4. Predicted 4SG Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Bicycle	0.01	1.4	0.00	0.0	0.01	1.4
Intersection	Collision with Fixed Object	0.02	2.9	0.03	5.3	0.04	8.3
Intersection	Non-Collision	0.00	0.6	0.00	0.2	0.00	0.8
Intersection	Collision with Other Object	0.00	0.3	0.00	0.4	0.00	0.7
Intersection	Other Single-vehicle Collision	0.00	0.2	0.00	0.1	0.00	0.3
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.04	7.9	0.00	0.0	0.04	7.9
Intersection	Total Intersection Single Vehicle Crashes	0.07	13.2	0.03	6.1	0.10	19.3
Intersection	Angle Collision	0.04	7.7	0.08	14.3	0.12	22.0
Intersection	Head-on Collision	0.01	1.1	0.01	1.8	0.01	2.8
Intersection	Other Multi-vehicle Collision	0.01	1.2	0.07	12.4	0.07	13.6
Intersection	Rear-end Collision	0.05	9.9	0.15	28.3	0.21	38.2
Intersection	Sideswipe	0.01	2.2	0.01	1.9	0.02	4.1
Intersection	Total Intersection Multiple Vehicle Crashes	0.12	22.1	0.32	58.6	0.43	80.7
Intersection	Total Intersection Crashes	0.19	35.3	0.35	64.7	0.54	100.0
	Total Crashes	0.19	35.3	0.35	64.7	0.54	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

March 21, 2025

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Report Overview

Report Generated: Mar 21, 2025 2:04 PM
Report Template: System: Multi-Page [System] (sscpm2, Jul 23, 2021 4:16 PM)

Evaluation Date: Fri Mar 21 13:55:24 PDT 2025
IHSDM Version: v17.0.0 (Sep 22, 2021)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: kendra.lolland
Organization Name:
Phone:
E-Mail:

Project Title: Folsom Toll_Oak Ave and Street D
Project Comment: Created Tue Mar 18 11:18:23 PDT 2025
Project Unit System: U.S. Customary

Site Set: Signal
Site Set Comment: Created Wed Mar 19 10:26:21 PDT 2025
Site Set Version: v1

Evaluation Title: Oak Ave Pkwy_St D_SSSC_2045
Evaluation Comment: Created Fri Mar 21 13:53:53 PDT 2025
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration

First Year of Analysis: 2045
Last Year of Analysis: 2045
Empirical-Bayes Analysis: None

Disclaimer Regarding Crash Prediction Method

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Section Types

Urban Arterial Site Set CPM Evaluation

Site Type

Type: 4SG
Calibration Factor: 1

Table 1. Evaluation and Crash Data (CSD) (if applicable) Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Number of Approaches with Permissive Left-Turn Phasing	Number of Approaches with Permissive/Protected or Protected/Permissive Left-Turn Phasing	Number of Approaches with Protected Left-Turn Phasing	Number of Approaches on which Right Turn on Red is Prohibited	Presence of Red-Light Cameras	Pedestrian Volumes Crossing all Intersection Legs (crossings/day)	Max. Number of Lanes Crossed by Pedestrians	Number of Bus Stops within 1000 ft of Intersection	Number of Schools within 1000 ft of Intersection	Number of Alcohol Sales Establishments within 1000 ft of Intersection
1	4SG2x2le5	Oak Ave Pkwy	at D St	2045: 7600	2045: 5000	2	0	yes	0	0	2	0	no	240	3	0	1	0

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Travel Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	4SG	Oak Ave Pkwy	at D St	1.281	1.2811	0.4331	0.8480	0.28	1.2811
		Total	Total	1.281	1.2811	0.4331	0.8480	0.28	1.2811

Table 3. Predicted Crash Frequencies by Year (4SG)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2045	1.28	0.43	33.803	0.85	66.197
Total	1.28	0.43	33.803	0.85	66.197
Average	1.28	0.43	33.803	0.85	66.197

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived

independently.

Table 4. Predicted 4SG Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Bicycle	0.02	1.4	0.00	0.0	0.02	1.4
Intersection	Collision with Fixed Object	0.03	2.0	0.06	4.7	0.09	6.7
Intersection	Non-Collision	0.01	0.4	0.00	0.2	0.01	0.6
Intersection	Collision with Other Object	0.00	0.2	0.01	0.4	0.01	0.6
Intersection	Other Single-vehicle Collision	0.00	0.1	0.00	0.1	0.00	0.2
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.05	4.0	0.00	0.0	0.05	4.0
Intersection	Total Intersection Single Vehicle Crashes	0.10	8.1	0.07	5.4	0.17	13.5
Intersection	Angle Collision	0.11	8.9	0.19	14.8	0.30	23.7
Intersection	Head-on Collision	0.02	1.3	0.02	1.8	0.04	3.1
Intersection	Other Multi-vehicle Collision	0.02	1.4	0.16	12.8	0.18	14.2
Intersection	Rear-end Collision	0.15	11.6	0.38	29.4	0.52	40.9
Intersection	Sideswipe	0.03	2.5	0.03	1.9	0.06	4.5
Intersection	Total Intersection Multiple Vehicle Crashes	0.33	25.7	0.78	60.8	1.11	86.5
Intersection	Total Intersection Crashes	0.43	33.8	0.85	66.2	1.28	100.0
	Total Crashes	0.43	33.8	0.85	66.2	1.28	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

March 24, 2025

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Report Overview

Report Generated: Mar 24, 2025 7:53 AM
Report Template: System: Multi-Page [System] (sscpm2, Jul 23, 2021 4:16 PM)

Evaluation Date: Mon Mar 24 07:47:49 PDT 2025
IHSDM Version: v17.0.0 (Sep 22, 2021)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: kendra.lolland
Organization Name:
Phone:
E-Mail:

Project Title: Folsom Toll_Praire City and Street D
Project Comment: Created Tue Mar 18 11:17:34 PDT 2025
Project Unit System: U.S. Customary

Site Set: Signal
Site Set Comment: Created Tue Mar 18 11:22:16 PDT 2025
Site Set Version: v1

Evaluation Title: Prairie City Rd_St D_Signal_2025
Evaluation Comment: Created Mon Mar 24 07:47:31 PDT 2025
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration

First Year of Analysis: 2025
Last Year of Analysis: 2025
Empirical-Bayes Analysis: None

Disclaimer Regarding Crash Prediction Method

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Section Types

Urban Arterial Site Set CPM Evaluation

Site Type

Type: 3SG
Calibration Factor: 1

Table 1. Evaluation and Crash Data (CSD) (if applicable) Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Number of Approaches with Permissive Left-Turn Phasing	Number of Approaches with Permissive/Protected or Protected/Permissive Left-Turn Phasing	Number of Approaches with Protected Left-Turn Phasing	Number of Approaches on which Right Turn on Red is Prohibited	Presence of Red-Light Cameras	Pedestrian Volumes Crossing all Intersection Legs (crossings/day)	Max. Number of Lanes Crossed by Pedestrians	Number of Bus Stops within 1000 ft of Intersection	Number of Schools within 1000 ft of Intersection	Number of Alcohol Sales Establishments within 1000 ft of Intersection
1	3SG2x2le5	Prairie City Rd	at St D	2025: 15860	2025: 4900	2	1	yes	0	0	1	0	no	20	5	0	0	0

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Travel Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	3SG	Prairie City Rd	at St D	1.773	1.7730	0.6354	1.1376	0.27	1.7730
		Total	Total	1.773	1.7730	0.6354	1.1376	0.27	1.7730

Table 3. Predicted Crash Frequencies by Year (3SG)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2025	1.77	0.64	35.840	1.14	64.160
Total	1.77	0.64	35.840	1.14	64.160
Average	1.77	0.64	35.840	1.14	64.160

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived

independently.

Table 4. Predicted 3SG Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Bicycle	0.02	1.1	0.00	0.0	0.02	1.1
Intersection	Collision with Fixed Object	0.03	1.6	0.09	5.3	0.12	6.9
Intersection	Non-Collision	0.01	0.5	0.00	0.1	0.01	0.6
Intersection	Collision with Other Object	0.00	0.2	0.01	0.4	0.01	0.6
Intersection	Other Single-vehicle Collision	0.00	0.1	0.00	0.1	0.00	0.2
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.01	0.5	0.00	0.0	0.01	0.5
Intersection	Total Intersection Single Vehicle Crashes	0.07	4.0	0.10	5.9	0.18	10.0
Intersection	Angle Collision	0.16	8.9	0.21	11.9	0.37	20.8
Intersection	Head-on Collision	0.02	1.2	0.02	1.2	0.04	2.4
Intersection	Other Multi-vehicle Collision	0.03	1.8	0.20	11.5	0.24	13.3
Intersection	Rear-end Collision	0.31	17.5	0.56	31.8	0.87	49.2
Intersection	Sideswipe	0.04	2.4	0.03	1.9	0.08	4.3
Intersection	Total Intersection Multiple Vehicle Crashes	0.56	31.8	1.03	58.2	1.60	90.0
Intersection	Total Intersection Crashes	0.64	35.8	1.14	64.2	1.77	100.0
	Total Crashes	0.64	35.8	1.14	64.2	1.77	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

March 24, 2025

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Report Overview

Report Generated: Mar 24, 2025 7:54 AM
Report Template: System: Multi-Page [System] (sscpm2, Jul 23, 2021 4:16 PM)

Evaluation Date: Mon Mar 24 07:52:13 PDT 2025
IHSDM Version: v17.0.0 (Sep 22, 2021)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: kendra.lolland
Organization Name:
Phone:
E-Mail:

Project Title: Folsom Toll_Praire City and Street D
Project Comment: Created Tue Mar 18 11:17:34 PDT 2025
Project Unit System: U.S. Customary

Site Set: Signal
Site Set Comment: Created Tue Mar 18 11:22:16 PDT 2025
Site Set Version: v1

Evaluation Title: Prairie City Rd_St D_Signal_2045
Evaluation Comment: Created Mon Mar 24 07:51:53 PDT 2025
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration

First Year of Analysis: 2045
Last Year of Analysis: 2045
Empirical-Bayes Analysis: None

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However, in the absence of local calibration factors (see HSM-1 Part C, Appendix A for guidance on calibration of the predictive models), it is neither appropriate nor advisable to directly compare the results from new models (from NCHRP Projects 17-58, 17-68, and 17-70) to results from HSM-1 models, as the models were not calibrated to the same base state data sets, and consequently can produce unexpected results. If local calibration factors are available and applied to both new models and HSM-1 models, then it may be appropriate to directly compare the results.*[Note: Work being performed under NCHRP Project 17-72 (Update of Crash Modification Factors for the Highway Safety Manual) is expected to re-calibrate many of the old (HSM-1) and new (e.g., NCHRP 17-70) models to data from a single (or small number of) states, that would allow results from all models to be directly compared.]*

The models produced for NCHRP Project 17-70 have independent value in terms of informing the design of a roundabout and assessing the effects of different design characteristics on the expected safety performance of a roundabout.

The HSM-1 interim method previously included in IHSDM for evaluating roundabouts on urban/suburban arterials (i.e., evaluating an existing intersection and then applying a Crash Modification Factor for replacing the existing intersection with a roundabout) has been deactivated in IHSDM, to minimize any confusion with the new roundabout methodology.

Section Types

Urban Arterial Site Set CPM Evaluation

Site Type

Type: 3SG
Calibration Factor: 1

Table 1. Evaluation and Crash Data (CSD) (if applicable) Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Number of Approaches with Permissive Left-Turn Phasing	Number of Approaches with Permissive/Protected or Protected/Permissive Left-Turn Phasing	Number of Approaches with Protected Left-Turn Phasing	Number of Approaches on which Right Turn on Red is Prohibited	Presence of Red-Light Cameras	Pedestrian Volumes Crossing all Intersection Legs (crossings/day)	Max. Number of Lanes Crossed by Pedestrians	Number of Bus Stops within 1000 ft of Intersection	Number of Schools within 1000 ft of Intersection	Number of Alcohol Sales Establishments within 1000 ft of Intersection
1	3SG2x2le5	Prairie City Rd	at St D	2045: 16200	2045: 4600	2	1	yes	0	0	1	0	no	20	5	0	0	0

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Travel Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	3SG	Prairie City Rd	at St D	1.782	1.7819	0.6403	1.1416	0.26	1.7819
		Total	Total	1.782	1.7819	0.6403	1.1416	0.26	1.7819

Table 3. Predicted Crash Frequencies by Year (3SG)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2045	1.78	0.64	35.934	1.14	64.066
Total	1.78	0.64	35.934	1.14	64.066
Average	1.78	0.64	35.934	1.14	64.066

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived

independently.

Table 4. Predicted 3SG Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Bicycle	0.02	1.1	0.00	0.0	0.02	1.1
Intersection	Collision with Fixed Object	0.03	1.6	0.09	5.2	0.12	6.8
Intersection	Non-Collision	0.01	0.5	0.00	0.1	0.01	0.6
Intersection	Collision with Other Object	0.00	0.2	0.01	0.4	0.01	0.6
Intersection	Other Single-vehicle Collision	0.00	0.1	0.00	0.1	0.00	0.2
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.01	0.5	0.00	0.0	0.01	0.5
Intersection	Total Intersection Single Vehicle Crashes	0.07	4.0	0.10	5.8	0.17	9.8
Intersection	Angle Collision	0.16	9.0	0.21	11.9	0.37	20.8
Intersection	Head-on Collision	0.02	1.2	0.02	1.2	0.04	2.4
Intersection	Other Multi-vehicle Collision	0.03	1.8	0.20	11.5	0.24	13.4
Intersection	Rear-end Collision	0.31	17.6	0.57	31.8	0.88	49.4
Intersection	Sideswipe	0.04	2.4	0.03	1.9	0.08	4.3
Intersection	Total Intersection Multiple Vehicle Crashes	0.57	32.0	1.04	58.2	1.61	90.2
Intersection	Total Intersection Crashes	0.64	35.9	1.14	64.1	1.78	100.0
	Total Crashes	0.64	35.9	1.14	64.1	1.78	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Attachment 22

Arborist Report,

dated April 2025

Arborist Report
for the
Toll Brothers at Alder Creek Property Project

Sacramento County, California

Prepared For:

Toll Brothers, Inc.

Prepared By:

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS
2525 Warren Drive
Rocklin, CA 95677

April 2025

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Appendix A – Individual Tree Survey Data

LIST OF ACRONYMS AND ABBREVIATIONS

Term	Definition
City	City of Folsom
Client	Toll Brothers, Inc
DSH	Diameter at Standard Height
ECORP	ECORP Consulting, Inc.
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
FPA	Folsom Plan Area
FPASP	Folsom Plan Area Specific Plan
ILF	In-Lieu Fee
ISA	International Society of Arboriculture
Project	Toll Brothers at Alder Creek Property Project
TPZ	Tree Protection Zone
Tree Ordinance	Folsom Tree Preservation Ordinance
USGS	U.S. Geological Survey

1.0 INTRODUCTION

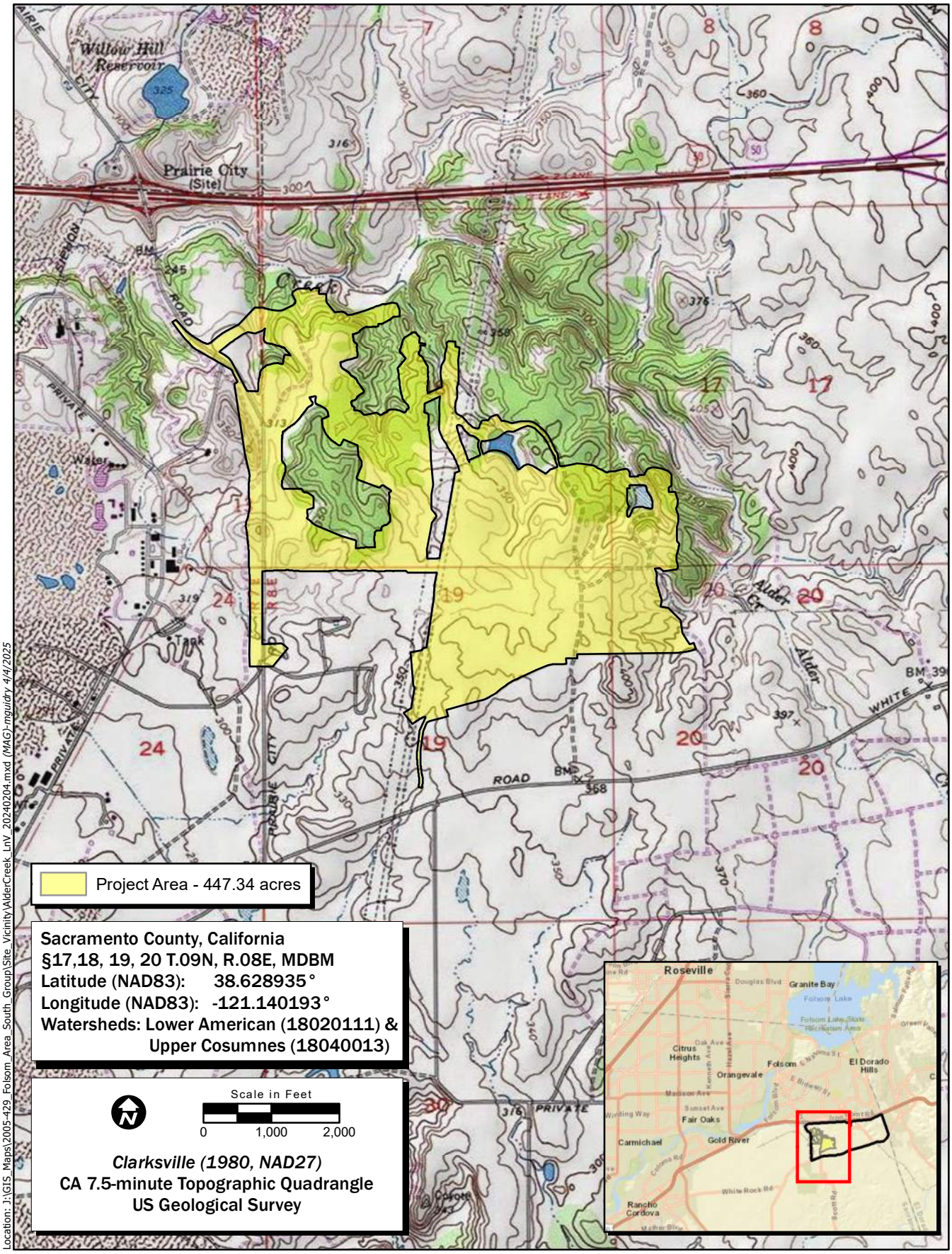
On behalf of Toll Brothers, Inc. (Client), ECORP Consulting, Inc. (ECORP) prepared this Arborist Report for the proposed Toll Brothers at Alder Creek Project (Project) located in Sacramento County, California in the City of Folsom (City). The purpose of this report is to quantify oak woodlands within the Project Area and provide a general assessment of the size and condition of individual trees to facilitate site planning and decision-making. This report also presents mitigation requirements for impacts to oak woodlands based on approved methods outlined in the Folsom Plan Area Specific Plan (FPASP; Torrence Planning et al. 2011) and the approved FPASP Environmental Impact Report/Environmental Impact Statement (EIR/EIS; U.S. Army Corps of Engineers and City 2011). This Arborist Report is intended to assist with the entitlement process of the Project and does not provide information regarding specific impacts or propose specific mitigation measures to offset impacts. A mitigation plan will be included as part of the Tree Removal Application once final impacts to oak resources are determined for the Project.

2.0 PROJECT LOCATION AND DESCRIPTION

The approximately 447.34-acre Project is located within the FPASP, south of Highway 50, west of East Bidwell Street, north of White Rock Road, and east of Prairie City Road (Figure 1). The Project Area corresponds to Section 17, 18, 19, 20, Township 9 North, Range 8 East (Mount Diablo Base Meridian) of the *Clarksville, California* 7.5-minute quadrangle (U.S. Geological Survey [USGS] 1980, NAD 27). The approximate center of the Project Area corresponds to latitude 38.628935º and longitude -121.140193º within the Lower American and Upper Cosumnes Watersheds (Hydrologic Unit Code #18020111 and #18040013; Natural Resources Conservation Service et. al. 2016).

The Project Area consists of relatively flat to rolling terrain with predominantly undeveloped annual grassland and blue oak woodland. Livestock shelters, a livestock corral with loading chute, and a large shed structure exist within the eastern section of the Project Area. A powerline bisects the center of the Project Area running roughly north-south with a few access roads through the eastern section of the Project Area. The Project Area is situated at an elevational range of approximately 280 to 370 feet above mean sea level.

Land use surrounding the immediate Project Area consists of primarily undeveloped annual grassland and oak woodlands that were historically used for cattle grazing, with a residential development to the southeast of the Project Area. A rural house exists along the eastern section of the Project Area. Buildout of the FPASP has generally progressed from east to west, and residential developments are present east of East Bidwell Street and north of White Rock Road. Highway 50 and dense commercial and residential developments are located north of the FPASP boundary.



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Map Date: 4/4/2025

iService Layer Credits: ESRI, USGS

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Figure 1. Project Location and Vicinity

2024-012 Toll Brothers at Alder Creek Property Project

3.0 OAK RESOURCES IN THE FOLSOM PLAN AREA

Two types of oak resources occur within the Folsom Plan Area (FPA): oak woodland and isolated oak trees. Oak woodland for the entire FPA was previously mapped and presented in the Conceptual Oak Tree Mitigation and Monitoring Plan for the FPASP (ECORP 2017). For the purposes of determining impacts and mitigation requirements for oak resources within the FPASP, oak woodland habitat was defined as stands of oak trees[1] with greater than 10-percent cover plus a 30-foot buffer as measured from the outer edge of the tree canopy (ECORP 2017). Any oak trees not included within the oak woodland were identified as isolated oak trees.

The approved EIR/EIS for the FPA requires Project applicants to conduct arborist surveys for isolated oak trees within all portions of a project site where tree removal or encroachment of development may occur. For each isolated tree, the arborist must record the Diameter at Standard Height (DSH), drip line radius, and general condition, along with uniquely tagging and mapping the location of each oak tree. These data are summarized and provided to the City to support the entitlement process and determine project impacts and mitigation requirements.

Standard arborist surveys for individual oaks within all oak woodlands in the FPA were deemed infeasible due to the number of trees within the woodlands. Impacts and mitigation for oak woodlands are generally assessed based on acreage of oak woodland canopy impacted or removed. However, the Specific Plan and EIR/EIS state that attempts must be made to preserve and protect oak resources within the FPA wherever practical. As such, the City has requested additional data (i.e., an arborist survey) on specific oak woodland trees that may be subject to removal or encroachment to determine whether additional avoidance or preservation measures are practicable and should be required.

3.1 Folsom Tree Preservation Ordinance

In addition to the requirements of the FPASP and the EIR/EIS, the Folsom Tree Preservation Ordinance (Tree Ordinance; City 2020) establishes standards and measures for preservation of trees within the City. The Tree Ordinance defines various Protected Trees within the City and provides methodology for data collection and mitigation measures for impacts - either direct or indirect - to Protected Trees. This report addresses these requirements where applicable.

3.1.1 Tree Ordinance

ECORP conducted the arborist survey according to the City's Tree Ordinance (City 2020) and used the following definitions to guide data collection:

- **Native Oak Tree**: Any tree with a single stem over six inches in DSH of the genus *Quercus* and species *lobata* (valley oak), *douglasii* (blue oak), *wislizenii* (interior live oak), *agrifolia* (coast live

[1] Oak woodlands were identified using geographic information systems technology, rectified aerial photographs, and field observation.

oak), or hybrids thereof; or any multi-trunked native oak tree having an aggregate DSH of 20 inches or more.

- **Protected Trees:** Native Oak Trees, Heritage Trees, Landmark Trees, and Regulated Trees.
- **Heritage Tree**: A tree on the City's Master Tree List with a single stem over 30 inches in DSH, or multi-trunked tree having an aggregate DSH of 50 inches or more. Excludes trees listed at "Not Eligible for Heritage Status."
- **Landmark Trees**: A tree or group of trees determined by the Folsom City Council to confer a significant community benefit to the general public due to its size, age, location, historic association, or ecological value.
- **Regulated Tree:** Trees required by the City's Zoning Code (such as parking lot shading trees and street trees), or required as conditions of development project approval (such as landscape buffer or screening trees), or required as mitigation for the removal of Protected Trees.

4.0 METHODS

The Client requested an arborist survey for isolated oaks within the Project Area, to support site planning and the evaluation of alternative Project layouts within the parcel. The Study Area for this survey excluded any trees within designated oak woodlands. Collecting this information will help quantify the size and condition of the trees within the oak woodlands and inform the Client's decisions related to Project design and potential oak woodland impacts.

ECORP arborist Jennifer West (International Society of Arboriculture [ISA] Certification # WE-14444A) and biologist Roxanne Kessler conducted a field survey on December 2, 2024. During the field survey, individual oak trees were assessed within the isolated oak woodlands and location data for each tree was recorded with sub-meter accuracy.

Data collected for individually assessed oak trees included species, tree tag number, DSH, dripline radius, and condition.

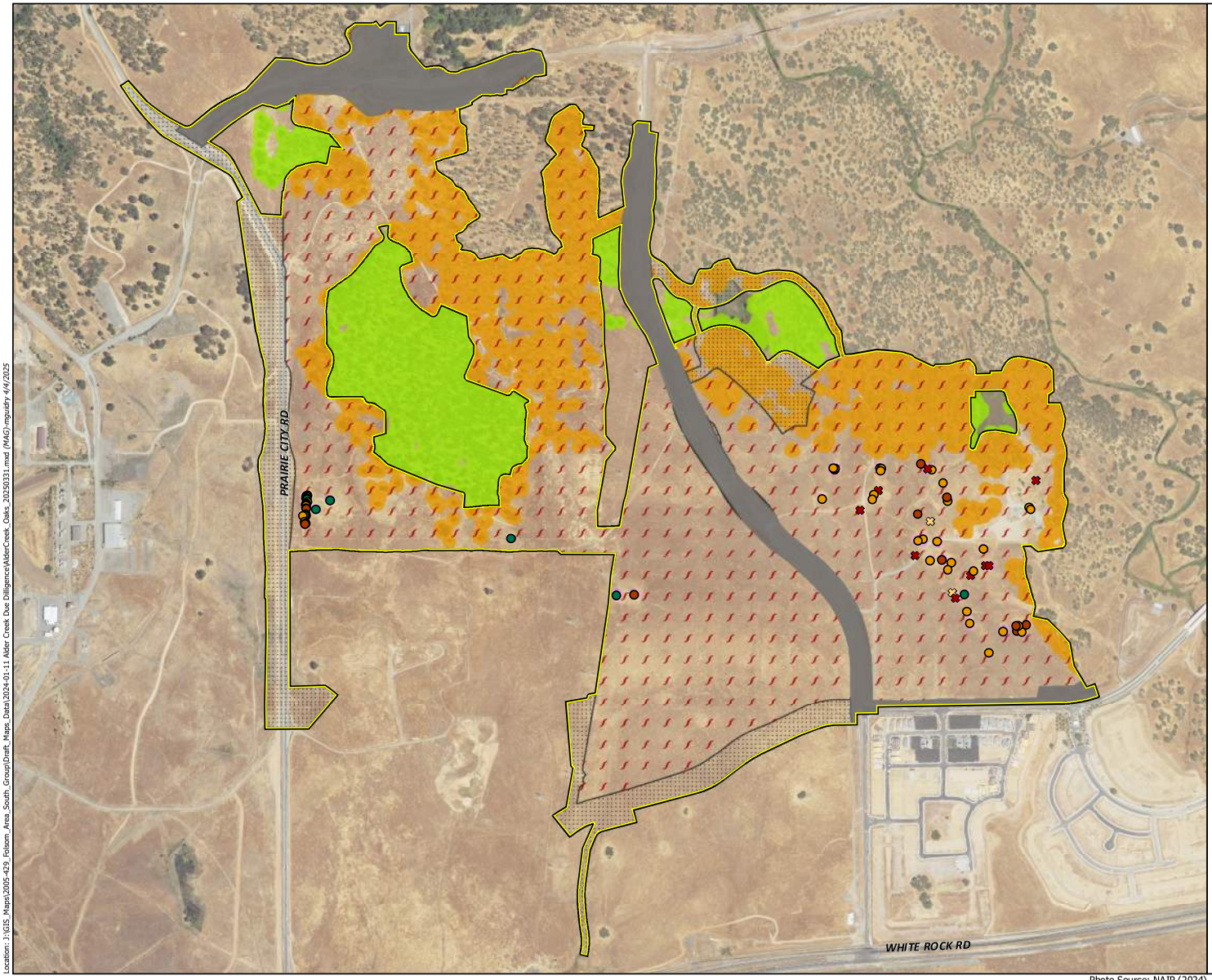


Figure 2.
Alder Creek Tree Survey Overview

Map Features

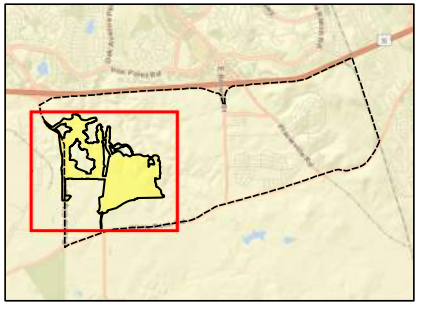
- Alder Creek Project Area - 447.34 acres
- Development Area
- Backbone Infrastructure
- Already Mitigated

Tree Survey Results

- Good (7)
- Fair (41)
- Poor (15)
- Hazardous or non-correctable (2)
- Dead (9)
- Not Impacted Oak Woodland - 59.55 acres
- Impacted Oak Woodland - 111.49 acres
- Impacted Isolated Oaks

Oak Woodland Impacts		
	Impacted	**Already Mitigated**
Backbone Infrastructure	11.01	23.12
Project Development	100.48	<.01
Grand Total	**111.49**	**23.12**

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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2024-012 Alder Creek

Scale in Feet
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Photo Source: NAIP (2024)
[1] ECORP, MSCE and Foothill Associates

Map Date: 4/4/2025

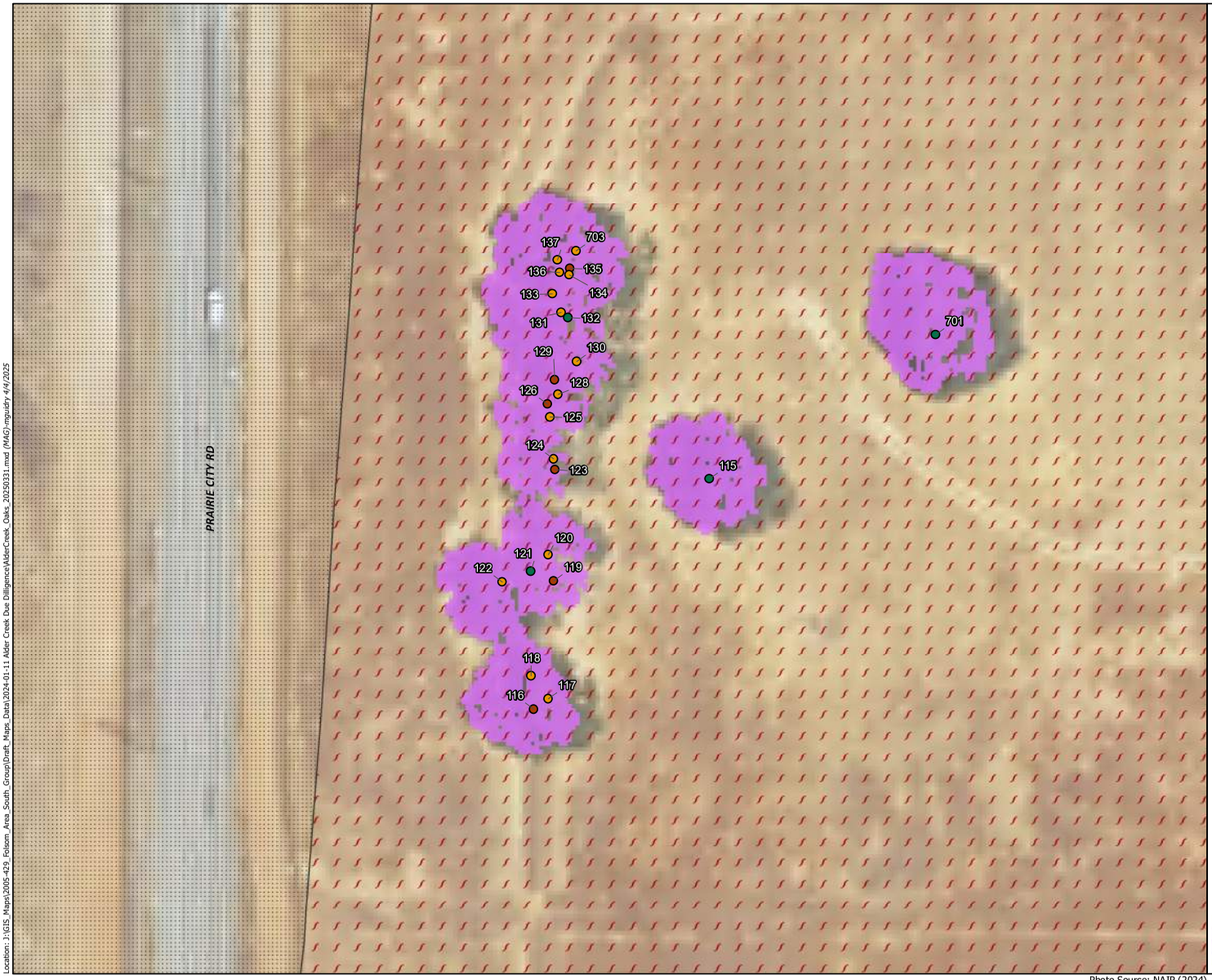


Figure 2.
Alder Creek Tree Survey
Detail 1 of 3

Map Features

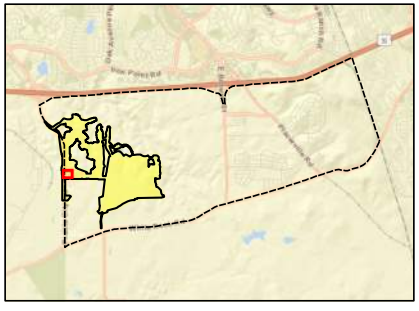
- Alder Creek Project Area - 447.34 acres
- Development Area
- Backbone Infrastructure

Tree Survey Results

- Good (4)
- Fair (14)
- Poor (6)
- Impacted Isolated Oaks

Oak Woodland Impacts		
	Impacted	**Already Mitigated**
Backbone Infrastructure	11.01	23.12
Project Development	100.48	<.01
Grand Total	**111.49**	**23.12**

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



ECORP Consulting, Inc.
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2024-012 Alder Creek

Scale in Feet
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Photo Source: NAIP (2024)
[1] ECORP, MSCE and Foothill Associates

Map Date: 4/4/2025

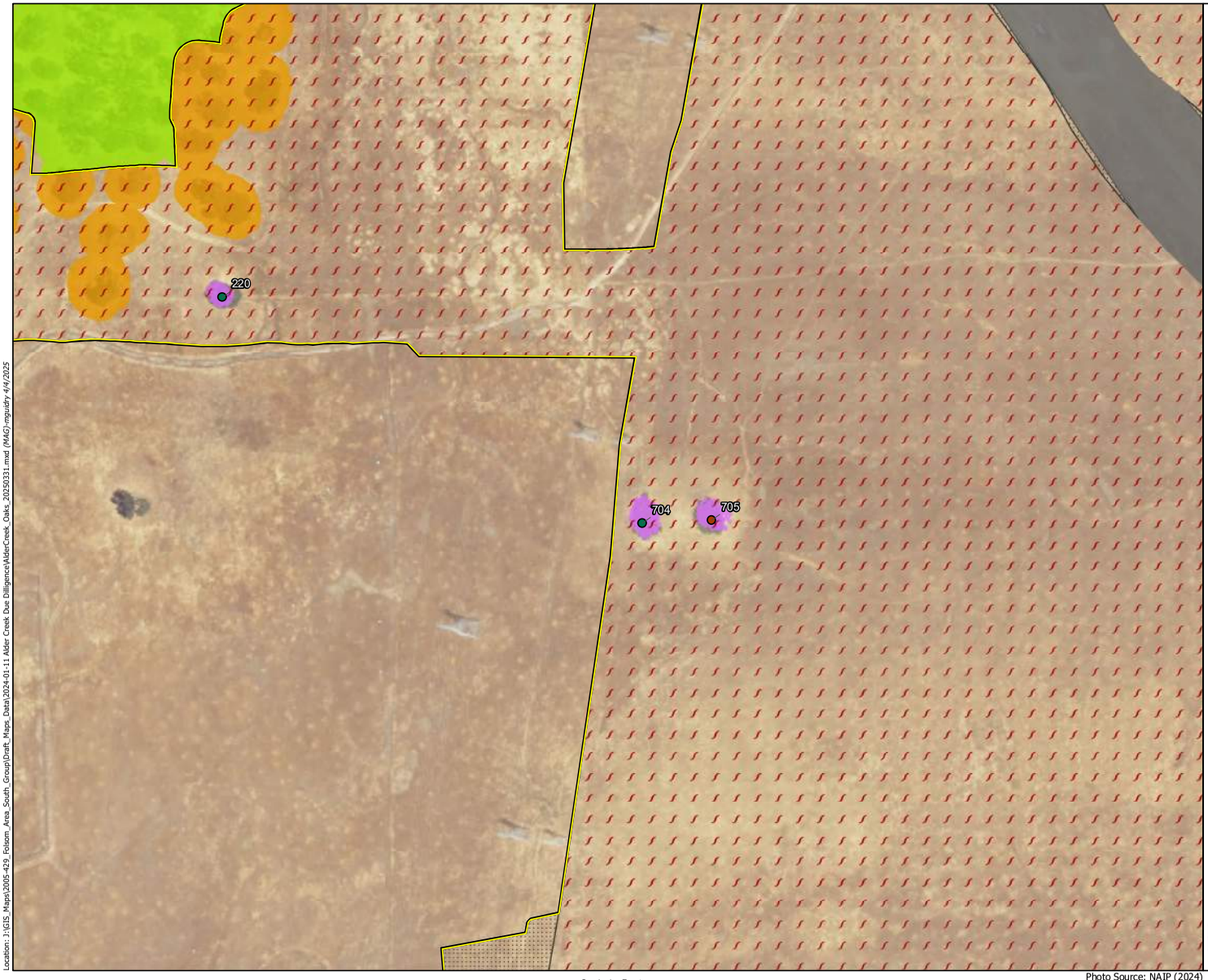


Figure 2.
Alder Creek Tree Survey
Detail 2 of 3

Map Features

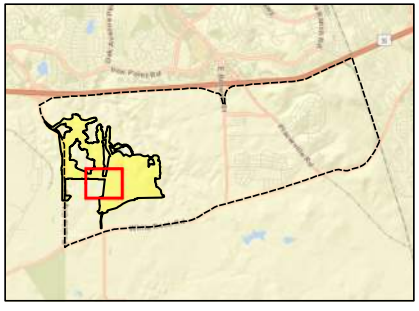
- Alder Creek Project Area - 447.34 acres
- Development Area
- Backbone Infrastructure
- Already Mitigated

Tree Survey Results

- Good (2)
- Poor (1)
- Not Impacted Oak Woodland - 59.55 acres
- Impacted Oak Woodland - 111.49 acres
- Impacted Isolated Oaks

Oak Woodland Impacts		
	Impacted	**Already Mitigated**
Backbone Infrastructure	11.01	23.12
Project Development	100.48	<.01
Grand Total	**111.49**	**23.12**

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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2024-012 Alder Creek

Scale in Feet
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Photo Source: NAIP (2024)
[1] ECORP, MSCE and Foothill Associates

Map Date: 4/4/2025

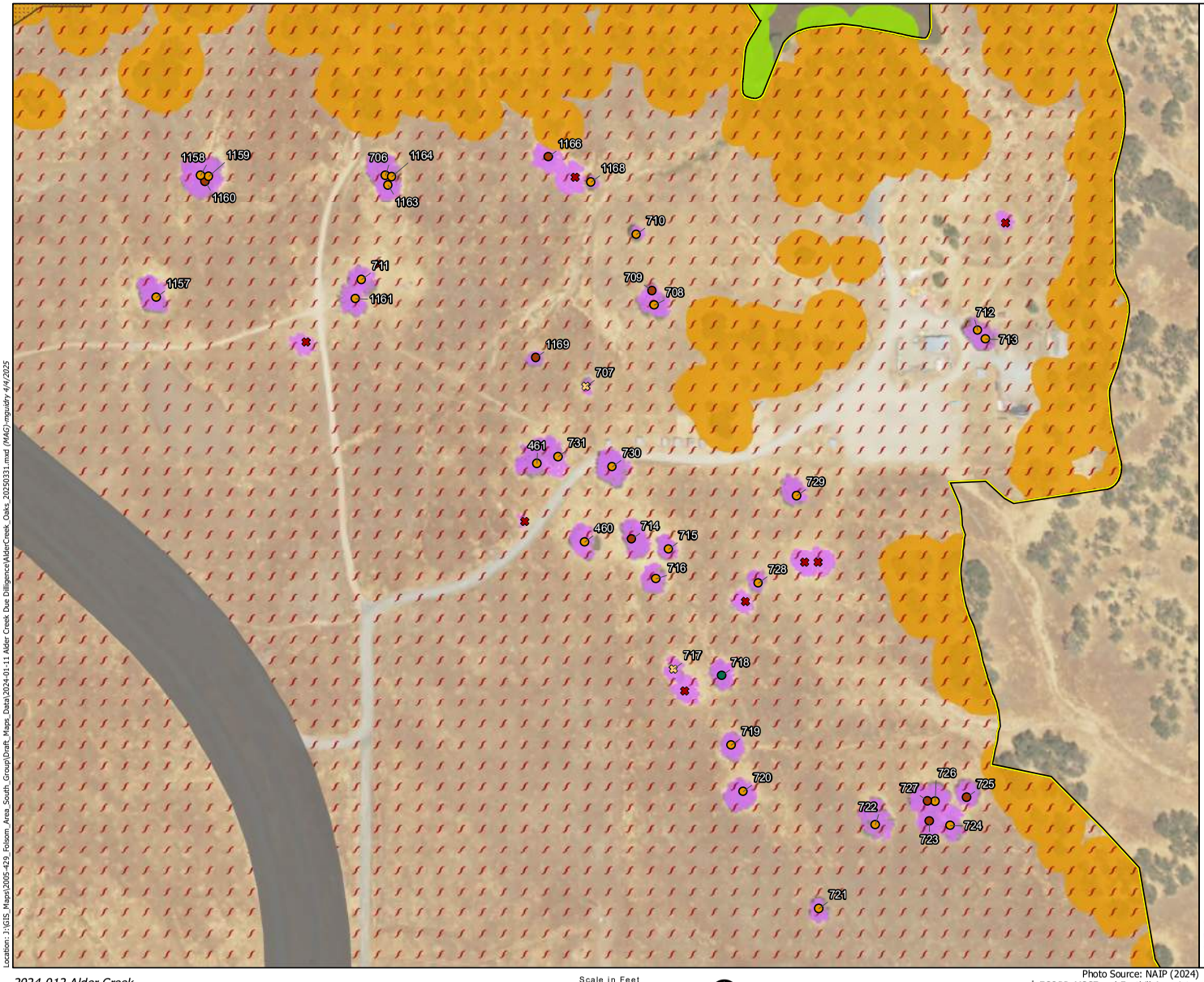


Figure 2.
Alder Creek Tree Survey
Detail 3 of 3

Map Features

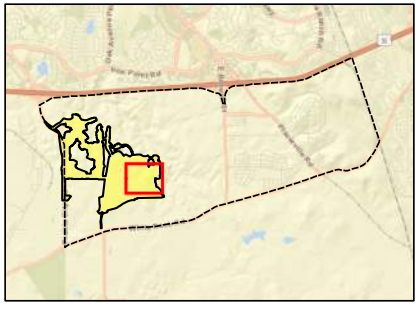
- Alder Creek Project Area - 447.34 acres
- Development Area
- Backbone Infrastructure
- Already Mitigated

Tree Survey Results

- Good (1)
- Fair (27)
- Poor (8)
- Hazardous or non-correctable (2)
- Dead (9)
- Not Impacted Oak Woodland - 59.55 acres
- Impacted Oak Woodland - 111.49 acres
- Impacted Isolated Oaks

Oak Woodland Impacts		
	Impacted	Already Mitigated
Backbone Infrastructure	11.01	23.12
Project Development	100.48	<.01
Grand Total	**111.49**	**23.12**

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

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2024-012 Alder Creek

Scale in Feet
0 100 200

Photo Source: NAIP (2024)
[1] ECORP, MSCE and Foothill Associates

Map Date: 4/4/2025

The survey results are intended for general Project planning purposes only. These results should not be considered a detailed tree analysis (i.e., these results do not include hazard assessment, tree health diagnosis, preservation/removal recommendations, or pruning advisement). The following terms define the collected data:

- **DSH:** Trunk diameter at 4.5 feet above the ground while standing on the high side of the tree. For a tree other than a multi-trunked tree that branches at or below 4.5 feet, DSH shall mean the diameter at the narrowest point between the grade and the lowest branching point. For multi-trunked trees (trees with multiple stems originating from a single root mass), this report lists the extrapolated DSH by taking the square root of the sum of each individual stem's DSH squared.
- **Dripline Radius:** A perfect circle around the tree with the radius being equal to the longest branch of the tree.
- **Condition:** An estimate of the tree's overall health. This includes evaluation of foliage, evidence of wound healing, evidence of fungal attack, density of insect galls, and the amount and condition of attached deadwood, as well as the obvious potential for structural failure of one or more major branches or trunks, the environment and condition of the root crown, symmetry of the canopy, and any noticeable effects of crowding caused by adjacent trees. ECORP rated each tree's condition according to the American Society of Consulting Arborists tree rating system (see Table 1).

Table 1. American Society of Consulting Arborists Tree Rating System

Rating	Rating Number	Rating Description
Excellent	5	No problem(s)
Good	4	No apparent problem(s)
Fair	3	Minor problem(s)
Poor	2	Major problem(s)
Hazardous or non-correctable	1	Extreme problem(s)
Dead	0	Dead

In addition, where appropriate, the surveyors noted any unusual features (e.g., large trunk cavities, obvious damage or disease, or girdling by barbed wire).

5.0 OAK RESOURCES IN THE PROJECT AREA

The results of the oak woodland assessment and tree survey for the Project are presented in the following sections and shown on Figure 2. Appendix A provides detailed data for the assessed trees.

5.1 Oak Woodland

Prior to the adoption of the FPASP, Torrence Planning mapped oak woodland for the entire FPA using aerial data that was available during the development of the Conceptual Oak Tree Mitigation and Monitoring Plan (ECORP 2017). There are a total of approximately 194.17 acres of oak woodland within the Project Area, with 11.01 acres previously impacted by the Backbone Phase 1 project, 82.68 acres that will be preserved, and up to approximately 100.48 acres proposed for impact. However, the acreage of oak woodland proposed for impact may change as project impact limits are finalized prior to preparation of tree permit applications, when the tree canopy is ground verified as stated in the EIR/EIS.

5.2 Isolated Oak Trees

Seventy-four (74) isolated oak trees occur within the Project Area. The survey recorded 9 dead, 2 hazardous or non-correctable, 15 poor, 41 fair, and 7 good trees.

6.0 MITIGATION REQUIREMENTS

Mitigation for tree impacts within the FPA follows the requirements of the EIR/EIS, rather than the current Tree Ordinance (City 2020). The following sections provide a general outline of the applicable mitigation requirements.

6.1 Direct Impact – Tree Removal

Per the FPASP, there are three options for mitigation of oak woodland and isolated oak tree impacts:

1. Preserve offsite oak woodland habitat. Existing, unprotected oak woodland habitat within Sacramento and El Dorado Counties may be secured and placed under conservation easement to be managed as oak woodland habitat in perpetuity.

2. Use of the In-Lieu Fee (ILF) program. The City has established an ILF program to compensate for tree removal. The fee is $150 per DSH inch removed. If the ILF is used as mitigation for oak woodland impacts, the oak woodland trees must be individually assessed for DSH, or a conversion calculation must be applied to convert acres of impacted woodland to DSH.

3. Create oak woodlands onsite. Onsite oak woodland creation is the City's preferred method for mitigation. However, onsite planting is not always feasible within the boundaries of a Project because there may be insufficient open space areas to support the plantings. If suitable planting areas are not available onsite, a deferred planting plan may also be an option; such a plan would be conducted in conjunction with a future project or phase of a project within the FPA where planting locations will be available. Under this mitigation alternative, all impacted oak woodland

trees must be individually assessed to obtain the DSH, or woodland acreage must be converted to DSH to implement the following planting options per the EIR/EIS:

a. Option 1: 24-inch box oak tree; one of these replaces two DSH inches removed.

b. Option 2: 15-gallon container oak tree; one of these replaces one DSH inch removed.

c. Option 3: five-gallon container oak tree; one of these replaces 0.5 DSH inch removed.

d. Option 4: A combination of the above options.

6.2 Indirect Impact – Preserved Trees

Protected Trees are trees that will be preserved onsite and not removed by construction. Construction-related activities can also result in indirect impacts to Protected Trees. Indirect impacts include activities such as, but not limited to, grading, trenching, paving, soil disturbance, and pruning of a tree within the Tree Protection Zone (TPZ; as defined in the City's 2020 Tree Ordinance).

6.2.1 Tree Protection Zones

The City has established standards for the TPZs of all Protected Trees during construction. These standards include the following:

- A pre-construction meeting between the Project Arborist, City Arborist, construction foreman/superintendent, and all applicable parties.
- High-visibility exclusionary fencing shall be shown on the Project plans and installed to protect the TPZ of all Protected Trees in proximity to the regulated activity. Unless the Project construction goes through the TPZ, the fencing shall encompass the entire TPZ.
- Weatherproof warning signs shall be attached to the TPZ fencing.
- Where construction access through the TPZ is necessary, the soil shall be protected via the installation of an access path. The access path shall consist minimally of 1-inch minimum thickness plyboards laid over a 4-inch layer of mulch. Additionally, trunk protection or high-visibility fencing shall be placed around the trunk.
- Tree pruning will be completed by an experienced arborist, preferably prior to the start of construction.

6.2.2 Protected Trees

During construction, the following measures are required for Protected Trees:

- If any follow-up pruning is discovered, tree pruning will be completed by an experienced contractor under the direct supervision of the Project Arborist.
- Any necessary root severance shall be performed with sharp, sterile hand tools. Roots that have been ripped, torn, or crushed shall be traced back to undamaged tissue and cut cleanly, resulting in a flat surface with the adjacent bark firmly attached.

- Roots exposed from grade cuts or trenching shall not be allowed to dry out. If roots will be exposed overnight or if directed by the Project Arborist, the cut faces shall be moistened and covered until they can be backfilled.
- The following actions are prohibited within the TPZ of Protected Trees:
  - Parking of vehicles, equipment, or storage of material within the TPZ, unless otherwise approved by the City.
  - Breaking roots with a backhoe or crushing them with a grader.
  - Wounding or breaking tree trunks or branches through contact with vehicles or heavy equipment.
  - Contaminating soil by washing out equipment or conducting vehicle maintenance.

6.2.3 Indirect Impact Monitoring

In addition to these standards of protection during construction, the FPASP and the City's Tree Ordinance require monitoring of trees that are indirectly impacted by construction. Whether they are located onsite or offsite, these trees will generally experience indirect impacts due to some level of construction within their TPZ. The following measures are recommended to monitor indirect impacts:

- Prior to grading, an arborist will tag and assess the trees that will be subject to indirect impacts (both onsite and offsite).
- Monitor the health of all Protected Trees potentially impacted by the construction activities throughout the duration of development of the Project. Per discussion with the City Arborist, this means the Project Arborist will be present onsite at the following times: the first one to two days of work within the Project Area when in the vicinity of Protected Trees, all construction activities within the TPZ of Protected Trees, and during all tree pruning. In addition, the Project Arborist will be on-call for questions related to work under all trees when not onsite. Because the Project Arborist will not likely be needed each day, a minimum of one weekly site visit will be conducted to check on the status of the trees within the Project Area when work is being conducted in the vicinity of Protected Trees.
- Prepare a certificate of compliance at the conclusion of the Project attesting compliance with the standards outlined in the Maintenance Standards and the conditions of the tree permit.
- Monitor the health of all Indirectly Impacted Protected Trees annually for a period of five years. If any monitored tree appears to be dead or dying within 5 years of Project implementation, the tree shall be replaced using the Direct Impact mitigation described above. Alternatively, if an Indirectly Impacted Tree is assessed as part of a future entitlement project and subject to removal as part of that project, monitoring may cease once the entitlement process is approved by the City and mitigation for that tree has been addressed.

7.0 CONCLUSION

This Arborist Report is intended to support the Project's planning and entitlement process. Oak woodlands are identified in the FPASP as a valuable natural resource, and the City Charter requires thirty percent of the FPA to be preserved in open space. The FPASP contains a policy to protect approximately 396.52 acres of existing oak woodland in perpetuity. The FPASP identifies approximately 131 acres of unavoidable impacts for construction of backbone infrastructure, and an additional approximately 114.62 acres of oak woodlands subject to impacts from residential and non-residential development.

The Project Area contains up to approximately 100.48 acres of oak woodland proposed for impact in the FPASP. For those areas where oak woodlands are identified for impact, the FPASP states an objective to "Preserve oak woodlands and isolated oak trees in residential and non-residential development parcels wherever practical." This report was conducted to support compliance with this objective and allow evaluation of the practicability of additional oak woodland habitat preservation in light of site constraints such as mass grading needed to create level building pads.

After final Project plans are developed, the information in this report will be used to assess oak woodland impacts and develop final mitigation requirements. Additional tree survey data may be collected as needed to support evaluation of individual tree impacts, ground verification of oak woodland, identification of Protected Trees, and applications for Tree Work Permits or Tree Removal Permits.

8.0 REFERENCES

City of Folsom (City). 2020. *Tree Preservation*. Title 12. Chapter 12.16 Tree Preservation. http://www.codepublishing.com/CA/Folsom/#!/Folsom12/Folsom1216.html. Accessed December 2024.

ECORP Consulting, Inc. (ECORP). 2017. *Conceptual Oak Tree Mitigation and Monitoring Plan for the Folsom Plan Area Specific Plan*. Prepared for the City of Folsom.

Natural Resources Conservation Service, U.S. Geological Survey (USGS), and U.S. Environmental Protection Agency. 2016. *Watershed Boundary Dataset for California*. https://datagateway.nrcs.usda.gov.

Torrence Planning, MacKay & Somps Civil Engineers, Jeffrey DeMure + Associates, ECORP Consulting, Inc. 2011. *Folsom Plan Area Specific Plan*. Dated June 28, 2011, as amended in 2018. Adopted by the City of Folsom, Resolution No. 8863.

U.S. Army Corps of Engineers and City of Folsom (City). 2011. *Final EIR/EIS Folsom South of U.S. Highway 50 Specific Plan Project*. SCH#2008092051. May 2011.

U.S. Geological Survey (USGS). 1980. *Folsom, California 7.5-minute Quadrangle*. Geological Survey. Denver, Colorado.

LIST OF APPENDICES

Appendix A – Individual Tree Survey Data

APPENDIX A

Individual Tree Survey Data

Tree Tag #	Common Name	Scientific Name	DSH (inches)	Individual Stems (if multi–stemmed)	Dripline (feet)	ASCA Rating	Heritage Tree	Field Notes
115	Blue Oak	*Quercus douglasii*	30.6	–	30	Good	Yes	–
116	Blue Oak	*Quercus douglasii*	7.2	–	10	Poor	No	Poor structure, basal wound
117	Blue Oak	*Quercus douglasii*	31.3	–	38	Fair	Yes	Thinning bark
118	Blue Oak	*Quercus douglasii*	25.3	–	25	Fair	No	–
119	Blue Oak	*Quercus douglasii*	24.7	–	25	Poor	No	Very sparse canopy
120	Blue Oak	*Quercus douglasii*	16.8	–	28	Fair	No	–
121	Blue Oak	*Quercus douglasii*	8.2	–	15	Good	No	–
122	Blue Oak	*Quercus douglasii*	30.1	–	25	Fair	Yes	Watersprouts
123	Blue Oak	*Quercus douglasii*	13	–	20	Poor	No	Dead branches
124	Blue Oak	*Quercus douglasii*	19.6	–	35	Fair	No	–
125	Blue Oak	*Quercus douglasii*	16.5	–	25	Fair	No	–
126	Blue Oak	*Quercus douglasii*	14	–	23	Poor	No	Watersprouts
128	Blue Oak	*Quercus douglasii*	22.5	–	30	Fair	No	–
129	Blue Oak	*Quercus douglasii*	9.1	–	18	Poor	No	Poor structure, watersprouts
130	Blue Oak	*Quercus douglasii*	14.5	–	30	Fair	No	–
131	Blue Oak	*Quercus douglasii*	30.5	–	40	Fair	No	Basal wound, codominant stems
132	Blue Oak	*Quercus douglasii*	13.6	–	30	Good	No	–
133	Blue Oak	*Quercus douglasii*	15.4	–	25	Fair	No	Basal rot
134	Blue Oak	*Quercus douglasii*	41.0	31.6, 26.2	35	Fair	Yes	Codominant stems
135	Blue Oak	*Quercus douglasii*	10.5	–	30	Poor	No	Basal rot
136	Blue Oak	*Quercus douglasii*	12.3	–	25	Fair	No	–

Tree Tag #	Common Name	Scientific Name	DSH (inches)	Individual Stems (if multi–stemmed)	Dripline (feet)	ASCA Rating	Heritage Tree	Field Notes
137	Blue Oak	*Quercus douglasii*	13.4	–	25	Fair	No	–
220	Blue Oak	*Quercus douglasii*	–	–	–	–	–	–
460	Blue Oak	*Quercus douglasii*	40.3	–	40	Fair	Yes	One branch fell and hit a couple others but rest of tree good
461	Blue Oak	*Quercus douglasii*	43.9	–	42	Fair	Yes	–
701	Blue Oak	*Quercus douglasii*	37	–	35	Good	Yes	–
703	Blue Oak	*Quercus douglasii*	16.1	–	18	Fair	No	–
704	Valley Oak	*Quercus lobata*	42.6	–	40	Good	Yes	–
705	Valley Oak	*Quercus lobata*	61.2	–	35	Poor	Yes	Structural damage with healthy canopy
706	Blue Oak	*Quercus douglasii*	45.1	–	40	Fair	Yes	–
707	Interior Live Oak	*Quercus wislizeni*	25.2	–	12	Hazardous or non–correctable	No	Main branches down
708	Interior Live Oak	*Quercus wislizeni*	36.1	–	30	Fair	Yes	–
709	Interior Live Oak	*Quercus wislizeni*	30.4	–	12	Poor	Yes	Many dead branches, trunk wounds
710	Interior Live Oak	*Quercus wislizeni*	16.2	–	15	Fair	No	–
711	Blue Oak	*Quercus douglasii*	36	–	35	Fair	Yes	–
712	Blue Oak	*Quercus douglasii*	26.1	–	30	Fair	No	Watersprouts and mistltoe
713	Blue Oak	*Quercus douglasii*	38	–	30	Fair	Yes	–
714	Blue Oak	*Quercus douglasii*	50.9	–	45	Poor	Yes	Main branch failure, unusual whirled/concentric ring growth at dead branches

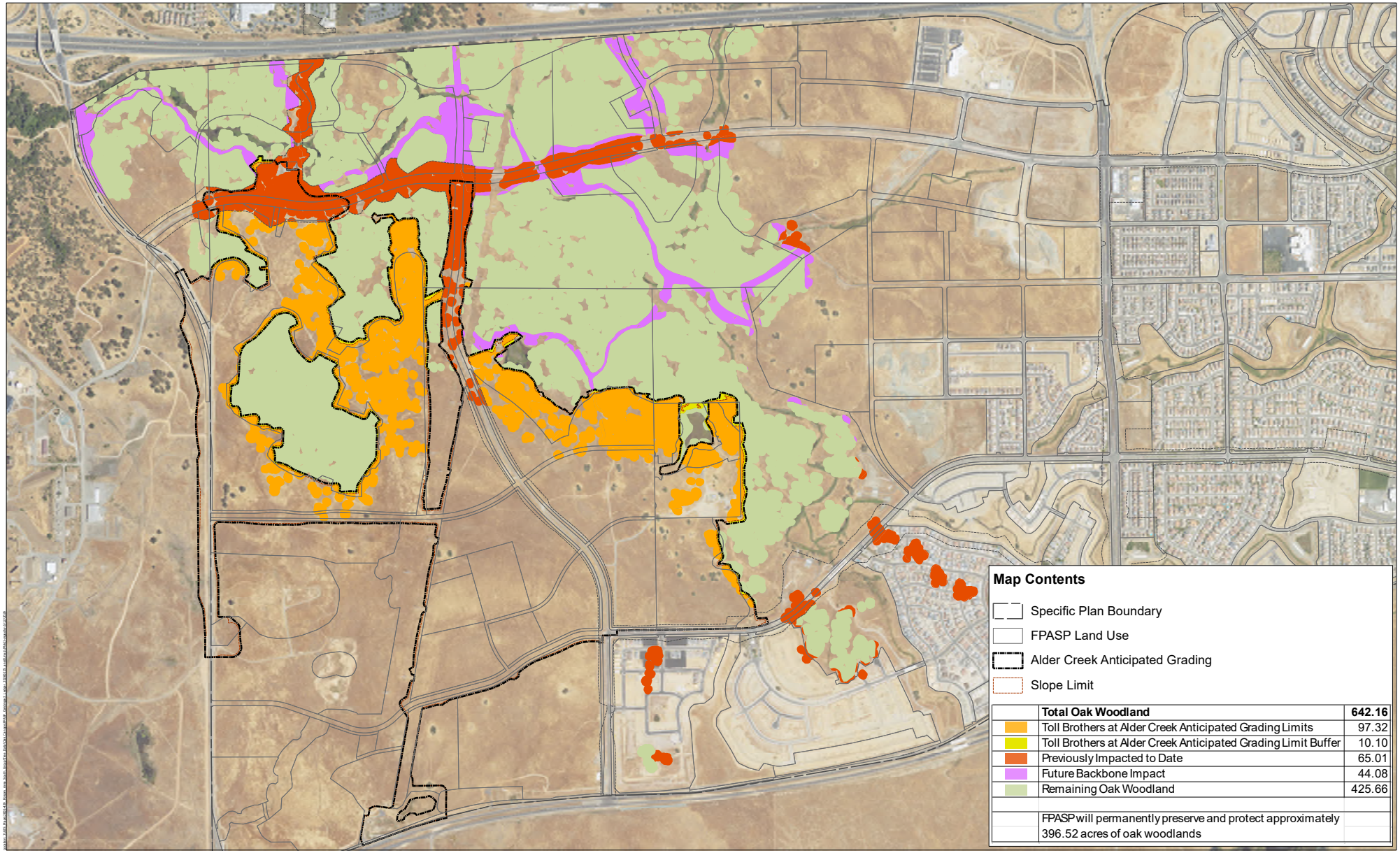
Tree Tag #	Common Name	Scientific Name	DSH (inches)	Individual Stems (if multi–stemmed)	Dripline (feet)	ASCA Rating	Heritage Tree	Field Notes
715	Blue Oak	*Quercus douglasii*	28.6	–	20	Fair	No	Somewhat sparse canopy, mistletoe
716	Blue Oak	*Quercus douglasii*	30.6	–	30	Fair	Yes	Sparse canopy
717	Blue Oak	*Quercus douglasii*	27.4	–	35	Hazardous or non–correctable	No	Many dead branches
718	Blue Oak	*Quercus douglasii*	30.5	–	32	Good	Yes	–
719	Blue Oak	*Quercus douglasii*	29.2	–	35	Fair	No	–
720	Blue Oak	*Quercus douglasii*	39.2	–	40	Fair	Yes	Watersprouts
721	Valley Oak	*Quercus lobata*	26.5	–	25	Fair	No	Watersprouts
722	Blue Oak	*Quercus douglasii*	49.5	–	40	Fair	Yes	Watersprouts
723	Blue Oak	*Quercus douglasii*	37.4	–	40	Poor	Yes	Watersprouts, codominant stems
724	Blue Oak	*Quercus douglasii*	45.6	–	35	Fair	Yes	Some watersprouts, a couple of downed branches
725	Blue Oak	*Quercus douglasii*	26.7	–	32	Poor	No	Sparse canopy, thinning bark
726	Blue Oak	*Quercus douglasii*	34.1	–	35	Fair	Yes	Thin canopy, some watersprouts
727	Blue Oak	*Quercus douglasii*	30	–	35	Poor	Yes	Sparse canopy, codominant stems, mistletoe
728	Blue Oak	*Quercus douglasii*	31.4	–	20	Fair	Yes	Sparse canopy
729	Blue Oak	*Quercus douglasii*	42.6	–	32	Fair	Yes	Codominant stems
730	Blue Oak	*Quercus douglasii*	41.2	–	35	Fair	Yes	–
731	Blue Oak	*Quercus douglasii*	49.2	–	45	Fair	Yes	Large branch down

Tree Tag #	Common Name	Scientific Name	DSH (inches)	Individual Stems (if multi–stemmed)	Dripline (feet)	ASCA Rating	Heritage Tree	Field Notes
1157	Blue Oak	*Quercus douglasii*	40.5	–	45	Fair	Yes	One large branch broken off main stem but obviously old wound, healthy canopy
1158	Blue Oak	*Quercus douglasii*	35.1	–	45	Fair	Yes	–
1159	Blue Oak	*Quercus douglasii*	22.1	–	40	Fair	No	Leaning structure
1160	Blue Oak	*Quercus douglasii*	43.2	–	45	Poor	Yes	Trunk wound and rot, sparse canopy
1161	Blue Oak	*Quercus douglasii*	30	–	40	Fair	Yes	Watersprouts
1163	Blue Oak	*Quercus douglasii*	34.1	–	40	Fair	Yes	–
1164	Blue Oak	*Quercus douglasii*	12.1	–	15	Fair	No	–
1166	Blue Oak	*Quercus douglasii*	28.8	–	28	Poor	No	Maybe dead, no leaf litter below, still has fine branches, barn owl roosting evidence
1168	Interior Live Oak	*Quercus wislizeni*	13.1	–	20	Fair	No	–
1169	Blue Oak	*Quercus douglasii*	53.5	–	25	Poor	Yes	Main branch down
5000	–	–	–	–	–	Dead	–	–
5001	–	–	–	–	–	Dead	–	–
5002	–	–	–	–	–	Dead	–	–
5003	–	–	–	–	–	Dead	–	–
5004	–	–	–	–	–	Dead	–	–
5005	–	–	–	–	–	Dead	–	–
5006	–	–	–	–	–	Dead	–	–
5007	–	–	–	–	–	Dead	–	–

Tree Tag #	Common Name	Scientific Name	DSH (inches)	Individual Stems (if multi–stemmed)	Dripline (feet)	ASCA Rating	Heritage Tree	Field Notes
5008	–	–	–	–	–	Dead	–	–

Notes: ASCA = American Society of Consulting Arborists; DSH = Diameter at Standard Height

Attachment 23
Folsom Plan Area Oak Woodlands Exhibit, dated June 12, 2026



ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Map Date: 6/12/2026
Photo Source: 2024, NAIP
Based on best available information to date.

Scale in Feet
0 1,000 2,000

Folsom Plan Area Oak Woodland

2005-429 Folsom Plan Area

Attachment 24

Resident Comment Letter, dated April 21, 2026

Jessica Brandt

From: Linda Silacci-Smith <[redacted]>
Sent: Tuesday, April 21, 2026 3:34 PM
To: Jessica Brandt
Subject: Toll Brothers at Alder Creek - MSTR25-00084

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [redacted]. Learn why this is important

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Jessica,

I will not be able to attend this meeting and have the following questions:

When will this project start?

Will Prairie City Road be upgraded?

Will Mangini Parkway be extended?

I believe there is an elementary school to be built in this development. Will it be built before the homes? All the Folsom schools are so impacted.

Will any lights be added to Mangini Parkway between Oak Avenue and East Bidwell?
It's a freeway on this stretch of the road! It is very rare any of the vehicles are traveling the posted 35 mph even though the speed is posted in several places and there are electronic signs in each direction letting you know how fast your vehicle is traveling.

Thank you in advance for your time,
Linda

Attachment 25
Lozeau Drury Comment Letter, dated June 8, 2026

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June 8, 2026

Mayor Justin Raithel
Vice-Mayor Anna Rohrbough
Councilmember Sarah Aquino
Councilmember Mike Kozlowski
Councilmember Barbara Leary
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Re: Toll Brothers at Alder Creek Project, File # MSTR25-00084, June 9, 2026 Meeting of the City Council, Agenda Item 10

Dear Mayor Raithel, Vice-Mayor Rohrbough, Councilmembers Aquino, Kozlowski, and Leary, and Ms. Brandt,

The following comments are submitted on behalf of Laborers Union of North America, Local Union 185 ("LIUNA") on Agenda Item No. 10 of the upcoming June 9, 2026 City Council hearing for the Toll Brothers at Alder Creek Project (File # MSTR25-00084) ("Project"). The Project would include the development of 1,424 single family dwelling units with varying densities covering 464.2 acres. The Project is located on undeveloped lands within the Folsom Plan Area Specific Plan (FPASP or Plan Area).

To comply with the California Environmental Quality Act ("CEQA"), staff has proposed that the Project is exempt from CEQA pursuant to CEQA Guidelines § 15182(c) and Government Code § 65457. These provisions provide an exemption from CEQA for residential development projects which implement and are consistent with a specific plan for which an environmental impact report ("EIR") has been previously certified. However, the exemption does not apply where new information or mitigation measures addressing

significant impacts become available after the adoption of the specific plan's EIR. "However, if after adoption of the specific plan, an event as specified in Section 21166 of the Public Resources Code occurs, the exemption provided by this subdivision does not apply unless and until a supplemental environmental impact report for the specific plan is prepared and certified…." (Gov. Code § 65457.) These events include:

> (a) Substantial changes are proposed in the project which will require major revisions of the environmental impact report.
> (b) Substantial changes occur with respect to the circumstances under which the project is being undertaken which will require major revisions in the environmental impact report.
> (c) New information, which was not known and could not have been known at the time the environmental impact report was certified as complete, becomes available.

(Pub. Res. Code § 21166(c).) The CEQA Guidelines further elaborate on this exception to the Specific Plan Exemption, providing that a subsequent EIR must be prepared if there is substantial evidence of any of the following events:

> (1) Substantial changes that are proposed in project which will require major revisions to the previous EIR must be due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;
> (2) Substantial changes that occur with respect to the circumstances under which the project is undertaken must be due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;
> (3) New information of substantial importance, which was not known and could not have been known at the time the previous EIR was certified means that the new information could not have been known with the exercise of reasonable diligence and shows:
>
> (A) The project will have one or more significant effects not discussed in the previous EIR;
> (B) Significant effects previously examined will be substantially more severe that shown in the previous EIR;
> (C) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or
>
> (D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

(14 Cal. Admin. Code § 15162(a).)

Substantial evidence of the presence of a special status species in an area of a proposed project the activities of which "have the potential to result in significant impacts to [the] species" has been held to be significant new information requiring a supplemental EIR pursuant to Section 21166(c). (*Moss v. Cnty. of Humboldt* (2008) 162 Cal.App.4th 1041, 1065–66 [presence of special status fish species in area of project that were "only recently brought to [county's] attention" where project's activities have the potential to result in significant impacts was new formation of substantial importance requiring supplemental EIR].) New information can be with respect to the project itself, but can also be in the form of better information with regard to calculating environmental impacts and new technologies available for the purposes of mitigation. (*Sec. Envt'l Sys. v South Coast Air Quality Mgmt. Dist.* (1991) 229 Cal.App.3d 110, 119 [requiring the preparation of an EIR prior to repermitting where new information revealed that initial assumptions and estimates greatly underestimated air pollution impacts and new technological controls had become available].)

In regard to considering new feasible mitigations for a project's impacts previously determined by a lead agency to be significant and unavoidable, CEQA requires a lead agency to prepare a statement of overriding consideration and specified findings to address a project's remaining significant and unavoidable adverse impacts. (*See* Pub. Res. Code §§ 21094, 21081(a); 14 CCR §15091(a).) "The requirement of a statement of overriding considerations is central to CEQA's role as a public accountability statute; it requires public officials, in approving environmental detrimental projects, to justify their decisions based on counterbalancing social, economic or other benefits, and to point to substantial evidence in support." (*Communities for a Better Environment v. Cal. Resources Agency* (2002) 103 Cal.App.4th 98, 124.) "The required findings constitute the principal means chosen by the Legislature to enforce the state's declared policy 'that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects…" (*City of Marina v. Bd. of Trs. of California State Univ.* (2006) 39 Cal.4th 341, 350 [quoting PRC §21002].) If, after all feasible mitigation measures and alternatives have been imposed, a project still has significant environmental impacts, the project may be approved only if the lead agency makes an express written statement "that specific overriding economic, legal, social, technological, or other benefits of the project outweigh the significant effects on the environment." (PRC §21081(b).)

On June 14, 2011, the City certified an EIR for the FPASP. Among other concerns, the 2011 EIR determined that operation of the large residential Project would result in significant and unavoidable impacts from construction emissions of PM-10 on sensitive receptors (DEIR, pp. ES-22-23), long-term operational emissions of reactive organic gases (ROGs) and nitrogen oxides (NOx) (DEIR, pp. ES-23-24), habitat loss and direct impacts on certain endangered, threatened and special status species (DEIR, ES-38 – 47), and construction-generated greenhouse gas emissions (DEIR, ES-61).

LIUNA has retained several expert consultants to review the 2011 EIR and the recent conformity analysis for the Project. LIUNA retained expert wildlife biologist, Dr. Shawn Smallwood, Ph.D. to determine whether any species that were not identified as special status species in 2011 have been subsequently designated special status by the California Department of Fish & Wildlife ("CDFW") or the United States Fish & Wildlife Service ("USFWS") and will be affected by the Project. Dr. Smallwood's analysis and curriculum vitae are attached as Exhibit A. Baseline Environmental Consulting has prepared expert comments reviewing the mitigation measures adopted in 2011 for the Project's significant and unavoidable operational pollution emissions and identified feasible mitigations that have come to light since that time and thus far have been overlooked by staff's reports. Baseline's comments and relevant curriculum vitae are attached as Exhibit B. LIUNA also has retained indoor air quality expert, Francis Offermann, PE, CIH. Mr. Offermann, a Certified Industrial Hygienist and Professional Mechanical Engineer provides a review of new technical information that has come to light since 2011 demonstrating that significant health risks will occur even if finishing materials compliant with the California Air Resources Board's Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products ("Formaldehyde ATCM") are used for the Project. Based on this new information, Mr. Offermann concludes that the Project will expose future residents to significant impacts resulting from emissions of the cancer-causing chemical formaldehyde. Mr. Offerman's comment letter and curriculum vitae are attached as Exhibit C.

A. Substantial Evidence Identifies New Information and Substantial Changes in Circumstances Regarding Special Status Species That Will be Adversely Affected by the Project.

The 2011 EIR confined its evaluation of the Specific Plan's wildlife impacts to special status species identified at the time. A number of species that were not identified by CDFW as special status in 2011 are now identified by the agency as special status species. Many species that have been identified as special status since 2011 occur within the Project area and will be affected by the proposed large scale residential development. CDFW's identification of these special status species subsequent to 2011 is new information of substantial importance which was not available in 2011. The 2011 EIR did not mention these newly identified special status species nor were the Project's impacts on these species or their habitat discussed. As a result, the City must prepare a supplemental EIR to address this important new information. (*See Moss v. Cnty. of Humboldt* (2008) 162 Cal.App.4th 1041, 1065–66.)

Special status species are those which "may be protected as threatened or endangered under state or federal law or are otherwise being tracked by the California Department of Fish and Wildlife (or the United States Fish and Wildlife Service) or a private organization such as the California Native Plant Society because the species are declining at a rate that could lead to their being listed or are otherwise sufficiently rare or threatened enough to warrant monitoring." (*Practice Under the California Environmental Quality Act* (2d. ed. Cal. CEB 2024 § 20.53.) Appendix G of the Guidelines requires agencies to consider whether a project may "[h]ave a substantial adverse effect . . . on any species identified as . . . special status [] in local or regional plans, policies, or

regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service." (CEQA Guidelines, App. G § (IV)(a).)

Dr. Smallwood maintains a database tracking the conservation status assigned to species in California by various wildlife agencies and professional wildlife organizations. Dr. Smallwood reviewed the species identified as special status species as of the 2011 DEIR. (Smallwood Comments, attached as Exhibit A.) He then compiled a list of all species that existing databases document occurring in the vicinity of the Project that have been identified by CDFW as special status since 2011 and which currently are included on the agency's special status species list. (*Id*.) Dr. Smallwood also identifies species identified by the United States Fish & Wildlife Service ("USFWS") as Birds of Conservation Concern, that also meet the definition of special status species. (*Id*.)

The 2011 EIR addressed a total of 28 animal species identified in 2011 as special status species. (DEIR, pp. 3A.3-11 – 3A.3-14.) These included thirteen bird species, five amphibians or reptiles, four invertebrates, and six mammals. (*Id*.)

CDFW identifies special status species on its "Special Animals List." (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406&inline.) "This list is also referred to as the list of 'species at risk' or 'special status species.'" (*Id*., p. i.) Species added to CDFW's special animals list since 2011 include species that are now identified as threatened or endangered, candidates for listing as threatened or endangered, as well as species at risk of being listed.

Species likely present within the Project area that have been added to the special status list and listed as endangered or threatened since 2011 include the Foothill yellow-legged frog (federal and state threatened) and the Western yellow-billed cuckoo (federally threatened and state endangered). (Smallwood Comment.) Neither of these more recently listed species is mentioned or evaluated in the 2011 EIR. Potential significant impacts to newly listed species that were not addressed in the prior EIR is new information of substantial importance requiring a supplemental EIR. (*Moss*, 162 Cal.App.4th at 1065–66.) Although the City's conformity analysis would not satisfy the City's duty to prepare a supplemental EIR to evaluate impacts to these new special status species, it is notable that the conformity analysis also makes no mention of this new information despite its purported purpose to review new information.

Several invertebrate species expected to occur in the Project area have become special status species since 2011 by being identified as candidates for listing as either endangered or threatened. These include Monarch butterfly, Western bumble bee, and Crotch bumble bee. (Smallwood Comment.) None of these species were mentioned or evaluated in the 2011 EIR. Their identification as special status species and formal candidates for listing is new information of substantial importance that must be addressed in a supplemental EIR.

The Conformity Analysis does not address either Monarch butterfly or Western bumble bee. As for the Crotch bumble bee, the Conformity Analysis confirms that the Project area "has potential foraging, nesting, and overwintering habitat for Crotch bumble

bee." (Conformity Analysis, p. 3-32.) The analysis also confirms that the bumble bee was not discussed or examined in the 2011 DEIR. As a result, rather than the truncated speculations regarding potential mitigation measures for the Crotch bumble bee, uninformed by any on-site surveys, the new information for this species should be vetted in a supplemental EIR and informed by public and agency comments.

Another species that has been identified as a special status species by CDFW since 2011 and which has been documented very close to the Project area is the Cackling goose (Aleutian). (Smallwood Comment.) No mention was made of this species in the 2011 EIR or the Conformity Analysis. A supplemental EIR must evaluate the Project's impacts on this new special status species.

Pursuant to the federal Fish & Wildlife Conservation Act ("FWCA"), 16 U.S.C. § 2901, the United States Fish & Wildlife Service ("USFWS") is required to maintain a list of birds of conservation concern. The FWCA mandates that USFWS "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act." (16 U.S.C. § 2912(a)(3).) USFWS's Birds of Conservation Concern ("BCC") list is the agency's "effort to carry out this mandate." (https://www.fws.gov/sites/default/files/documents/birds-of-conservation-concern-2021.pdf.) "The overall goal of this report is to identify those bird taxa (beyond those already designated as federally threatened or endangered) that represent the highest conservation priorities of the USFWS." (*Id*.) Accordingly, species included on USFWS's BCC list meet the criteria set forth in the CEQA Guidelines for lead agencies to assess species "identified as . . . special status … by the U.S. Fish and Wildlife Service." (CEQA Guidelines, App. G § (IV)(a).) Birds identified as BCC are "being tracked by … the United States Fish and Wildlife Service … because the species are declining at a rate that could lead to their being listed or are otherwise sufficiently rare or threatened enough to warrant monitoring." (CEB 2024 § 20.53.)

USFWS has identified at least 14 bird species occurring in the Project area as Birds of Conservation Concern since 2011. (Smallwood Comment.) These include Western grebe, Clark's grebe, Calliope hummingbird, American avocet, Pectoral sandpiper, Lesser yellowlegs, Willet, Franklin's gull, Heermann's gull, Western gull, Wrentit, California thrasher, Cassin's finch and Bullock's oriole. (*Id*.) Because USFWS has identified these species as BCC, they are special status species as defined by Appendix G. None of these species were mentioned or evaluated in the 2011 EIR. USFWS's heightened concern for these species that are likely to become candidates for listing unless conservation measures are implemented is new information of substantial importance that must be addressed in a supplemental EIR.

B. Substantial Evidence Identifies New Feasible Mitigation Measures That Would Further Mitigate the Project's Significant and Unavoidable Air Quality and Greenhouse Gas Impacts.

The 2011 EIR determined that the Project's emissions of ROG, NOx, PM10, PM2.5 and ozone would cause significant air quality impacts by exceeding the SMAQMD-recommended threshold of 65 lb/day for ROG and NO_X and conflict with air quality planning efforts in the Sacramento Valley Air Basin. (DEIR, p. 3A.2-44.) In order to mitigate this significant impact, the 2011 EIR established Mitigation Measure 3A.2-2 which required the Project to "implement all measures prescribed in the SMAQMD-approved *Folsom Plan Area Specific Plan Air Quality Mitigation Plan* (AQMP) (Torrence Planning 2008)." (*Id*., p. 3A.2-43.) The AQMP established mitigation measures focused on promoting bicycle use, pedestrian safety, bus shelters, traffic calming, minimizing parking, providing for grid-style street routing, prohibiting wood burning stoves, requiring Energy Star roofing materials, providing complimentary electric lawnmowers to each single family detached dwelling homeowner. (AQMP, pp. 12-21.)

The Conformity Analysis describes Mitigation Measure 3A.2-2 and only addresses whether the Project would increase the severity of the significant operational air quality impacts identified in the 2011 EIR. It makes no effort to review or assess new mitigation measures that could reduce the impacts. (*See* Conformity Analysis, p. 3-24.) Without any explanation of any evidence, the Conformity Analysis merely asserts that "[t]here is no new information that results in mitigation measures that are considerably different than in the Specific Plan FEIR." (Conformity Analysis, p. 3-30.)

Contrary to that unsupported conclusion, there are significant, feasible mitigation measures available that must either be adopted by the City or evaluated in a supplemental EIR. Baseline Environmental Consulting reviewed the Project, the 2011 EIR and the Conformity Analysis and identified two mitigation measures that are considerably different from those analyzed in the 2011 EIR which would substantially reduce the Project's significant operational air quality impacts. (Baseline Comments, attached as Exhibit B; 14 Cal. Admin. Code § 15162(a).) The two measures include:

Mitigation Measure 1. For each single-family dwelling unit, at least one Level 2 EV charger shall be installed with a dedicated 208/240-volt 40-ampere branch circuit between the main service or subpanel and a listed cabinet, box or other enclosure near the Level 2 EV charger. A battery electric storage system designed to support the Level 2 EV charger shall be installed and integrated with the solar photovoltaic system required for the dwelling unit.

New Mitigation Measure 2. During construction, super-compliant volatile organic compound (VOC) paints with a maximum VOC content of 10 grams per liter shall be used on the exterior and interior of each single-family dwelling unit. The project sponsor shall submit a signed certification statement to the City of Folsom Planning Department confirming that the super-compliant VOC requirement has been incorporated into the construction contract specifications, for review and approval.

Baseline's expert review indicates that these two mitigation measures are readily available and would substantially reduce the Project's previously assessed air pollution levels. Given the existing Energy Code requirements for new homes to be electric-ready for electricity heat pumps and appliances, the addition of Level 2 EV chargers is a nominal addition to each new home proposed in the Project. Likewise, new super-compliant VOC paints would be an insignificant incremental cost for each home. Neither of these mitigations were available in 2011 and are considerably different from Mitigation Measure 3A.2-2. Thus, should the City decline to include these mitigations, a supplementary EIR must be prepared.

C. Substantial Evidence Identifies New Information of Significant Health Impacts from Indoor Air Pollution and the Project's Emissions of Carcinogenic Formaldehyde.

New information has come to light since the 2011 EIR establishing a significant risk to the health of future residents from the Project's use of composite wood finishing materials in the Project's interior spaces that will emit formaldehyde at levels resulting in cancer risks greatly exceeding the 10 in a million cancer risk threshold identified by the SMAQMD. (*See* 2011 DEIR, p. 3A.2-24.) The new information shows that these excessive health risks will occur even if finishing materials compliant with the California Air Resources Board's Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products (Formaldehyde ATCM") are used for the Project. (Offermann Comments, attached as Exhibit C.)

Mr. Offermann explains that many composite wood products typically used in modern home construction contain formaldehyde-based glues which off-gas formaldehyde over a very long time period. He states, "The primary source of formaldehyde indoors is composite wood products manufactured with urea-formaldehyde resins, such as plywood, medium density fiberboard, and particleboard. These materials are commonly used in building construction for flooring, cabinetry, baseboards, window shades, interior doors, and window and door trims." (Offermann Comments, p. 3.)

Mr. Offermann concludes that future residents of the Project will be exposed to a cancer risk from formaldehyde of approximately 120 per million, ***even assuming*** that all materials are compliant with the California Air Resources Board's formaldehyde airborne toxics control measure. (Offermann Comments, p. 4.) This exceeds SMAQMD's CEQA significance threshold for airborne cancer risk of 10 per million. Importantly, Mr. Offermann's conclusions are based on studies conducted in 2019 and therefore were not available when the 2011 EIR was approved. (*Id.*, p. 3.)

The CARB requirements are known as the Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products ("Formaldehyde ATCM"). (17 Cal.Code Regs. § 93120-93120.12.) Composite wood products include hardwood plywood, particleboard ("PB"), and medium density fiberboard ("MDF"). (*Id.*, § 93120(b); § 93120.1(a)(8).) The rules rely on prohibiting the sale, distribution, supply, or manufacturing of plywood, PB, and MDF that exceed formaldehyde emission standards established by the rule. (*Id.*, § 93120.2(a).). The standards were phased in over a period

of years. By January 1, 2009, composite wood products had to comply with the Phase 1 emission standards established for each type of product. (*Id*., § 93120.2(a) (a certain category of hardwood plywood products had until July 1, 2009 to meet the standard applicable to those products).). Each product category then had several years to comply with a lower Phase 2 standard. (*Id*., § 93120.2(a).). Thus, by January 1, 2010, no hardwood plywood with a veneer core could be sold in California without meeting its Phase 2 formaldehyde emission standard. (*Id*.) Particle board and MDF products had to comply with their Phase 2 standard by January 1, 2011. Thin MDF had to comply with its applicable standard by January 1, 2012. (*Id*.) The remaining plywoods with composite cores had to comply no later than July 1, 2012. (*Id*.)

Mr. Offermann explains that residences using materials that comply with the Phase 2 formaldehyde emissions standards will pose significant cancer risks based on his participation in a follow-up 2020 study by Brett C. Singer prepared for the Lawrence Berkeley National Laboratory, co-authored by Mr. Offermann, as well as his own extensive experience studying and evaluating formaldehyde emissions from products and buildings. The 2020 Singer study measured formaldehyde levels in homes built after the CARB rules went into effect. (Offermann Comment, p. 3; Singer, B.C., et al., "Indoor Air Quality in California Homes with Code-Required Mechanical Ventilation" (2020) [attached as Exhibit D].) Thus, most of the homes included in the study were constructed with materials that were subject to the Phase 2 emission standards. The 2020 Singer Study was the first study documenting that, even where a residential structure was constructed from composite wood materials that comply with CARB's Formaldehyde ATCM, a significant amount of formaldehyde will nevertheless be emitted to the indoor air of homes. Mr. Offermann's calculations applying that newer study confirm that the health risks posed by those formaldehyde concentrations greatly exceed the significance threshold for airborne TACs of a 10 in 1 million risk of cancer.

The Folsom Plan Area Specific Plan relies substantively on CARB's Formaldehyde ATCM, providing at Policy 10.81 that "Particleboard, medium density fiberboard (MDF) and hardwood plywood shall comply with low formaldehyde emission standards." (FPASP, p. 10-35.) The impacts of formaldehyde emissions to indoor air in residential projects was not addressed in the 2011 EIR. Although Policy 10.81 surely was intended to protect future residents, the new information contained in the 2020 Singer study indicates that the CARB Formaldehyde ATCM does not lower cancer risks from indoor formaldehyde emissions to less than significant levels.

This indoor air quality impact could not have been known until 2020 when the Singer study was published showing that buildings using composite wood products that comply with the CARB formaldehyde standards vastly exceed CEQA significance thresholds for cancer risk. (Offerman, pp. 3-4.) Therefore, this impact was not known and could not have been known when the 2011 EIR was approved. When scientific information was not available at the time of prior CEQA review, more recent studies showing that a project may have more serious human health or environmental impacts constitute significant new information requiring a subsequent EIR. (*Security Envt'l Sys. v South Coast Air Quality Mgmt. Dist*. (1991) 229 Cal.App.3d 110, 124; *Meridian Ocean Sys. v. State Lands Com.* (1990) 222 Cal.App.3d 153, 169). As such, the staff report's

conclusion that an exemption is warranted is improper under Gov't Code § 65457 and CEQA Guidelines § 15182 and supplemental environmental review is required. Mr. Offerman's expert comments are substantial evidence of new significant information and significant effect to air quality and health risks, precluding the City's reliance on these CEQA exemption provisions.

The City has a duty to investigate issues relating to a project's potential environmental impacts. (See *County Sanitation Dist. No. 2 v. County of Kern* (2005) 127 Cal.App.4th 1544, 1597–98. ["[U]nder CEQA, the lead agency bears a burden to investigate potential environmental impacts."].) This is especially true for toxic air contaminants such as formaldehyde. The proposed Project will have significant impacts on air quality and health risks by emitting cancer-causing levels of formaldehyde into the air that will expose future residents and employees to cancer risks in excess of SMAQMD's threshold of significance for cancer health risks of 10 per million.

Additionally, Mr. Offermann suggests mitigating the Project's indoor air quality impacts by requiring all composite wood products used in construction of the Project to be manufactured with CARB-approved no-added formaldehyde (NAF) resins. (Offermann Comments, pp. 11-13.) Because indoor air quality impacts were not analyzed in the 2011 EIR, the City has not considered the use of NAF composite wood products. Furthermore, such products have only become readily available recently and, thus, could not have been considered in 2011. These mitigation measures also are new information of substantial importance triggering an additional CEQA review. (14 Cal. Admin. Code § 15162(a)(3)(C) & (D).) Notably, even compliance with California's green building standards does not address this impact because the building standards do not change the CARB regulations. As Mr. Offermann explains, the use of CARB-compliant composite wood materials pursuant to the green building code does not prevent health risks as high as 12 times the 10 in a million cancer risk threshold. (Offerman Comments, pp. 3-4.)

For all of the above reasons, staff is incorrect in relying on Gov't Code § 65457 and CEQA Guidelines § 15182. The City must prepare a supplemental EIR to address the new information and mitigation measures discussed above. Thank you for considering these comments.

Sincerely,

Michael Lozeau
Lozeau Drury LLP

EXHIBIT A

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6 June 2026

RE: Alder Creek Parkway

Dear Mr. Lozeau,

As you requested, I compared the 2011 and 2026 California Department of Fish and Wildlife (CDFW) Special Animal Lists for the presence and status of those species of wildlife with a reasonable likelihood of occurrence on or near the Alder Creek Parkway, near Folsom California. Of the 113 special-status species in Table 1, seven have been downgraded in status (light green shade in Table 1), and 31 have been upgraded in status (light orange shade in Table 1) between 2011 and 2026, where downgraded means that one or more listings had been removed, and upgraded means the opposite.

I note that CDFW's Special Animal Lists do not identify birds protected by California's Birds of Prey Code. Additionally, the Lists do not identify the birds (golden eagle and bald eagle) protected by the Bald and Eagle Protection Act (BGEPA). Please be aware that in Table 1, I report the Species of Special Concern (SSC) rankings of 1, 2, and 3, but these rankings do not appear on the Special Animals Lists. I included these rankings because they are reported in Shuford and Gardali (2008), which was commissioned by CDFW.

There are various complications in my comparison. For one, FP, which stands for federally proposed for listing, appears on the 2011 Special Animals List for mountain plover, but although the definition remains on the 2026 Special Animals List, it is not assigned to any species. I suspect it is no longer applied. Another is that the 2011 List reports some species as BCC, even though they were not on the 2008 BCC list, and the 2011 List fails to report some species as BCC, even though they were on the 2008 BCC list. Also, Western Bats Working Group (WBWG) rankings do not appear on the 2026 Special Animals List, possibly because the WBWG is no longer active. The WBWG web site still exists, but it has lost functionality. Additional complications are explained in Table footnotes.

Best Regards,

Shawn Smallwood, Ph.D.

LITERATURE CITED

Shuford, W. D., and T. Gardali, [eds.]. 2008. California bird species of special concern: a ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California.

Table 1. *Occurrence likelihoods of special-status species of wildlife at or near the proposed project site, according to eBird/iNaturalist records (https://eBird.org, https://www.inaturalist.org), and based on survey findings by environmental consults or myself at or near the project site (bold font), where 'Very close' indicates within 1.5 miles of the site, "nearby" indicates within 1.5 and 4 miles, and "in region" indicates within 4 and 30 miles, and 'in range' means the species' geographic range overlaps the site. Status is compared between the 2011 and 2026 CDFW Special Animals Lists, of which light orange shade indicates that status was either added or upgraded between 2011 and 2026, and light green shade indicates status was downgraded.*

Common name	***Species name***		**Status**[1]		
		2011	**2026**		
Conservancy fairy shrimp	*Branchinecta conservatio*	FE	FE		In range
Vernal pool fairy shrimp	*Branchinecta lynchi*	FT	FT		Nearby
Vernal pool tadpole shrimp	*Lepidurus packardi*	FE	FE		In region
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	FT	FT		In region
Monarch	*Danaus plexippus*	None	FC	2019	Very close
Crotch's bumble bee	*Bombus crotchii*		CCE	2019	Very close
Western bumble bee	*Bombus occidentalis*		CCE	2019	In range
California tiger salamander	*Ambystoma californiense*	FT, CT, SSC	FT, CT, WL		In region
Western spadefoot	*Spea hammondii*	SSC	FC, SSC; CCT petition to be decided 16 June 2026	2023	In region
Foothill yellow-legged frog	*Rana boylii*	SSC	FT, CT	2020, 2021	Nearby
California red-legged frog	*Rana draytonii*	FT, SSC	FT, SSC		In region
Western pond turtle	*Actinemys marmorata*	SSC	FC, SSC	2023	**On site**
Coast horned lizard	*Phrynosoma blainvillii*	SSC	SSC		Nearby
Brant	*Branta bernicla*	SSC2	SSC2		In region
Cackling goose (Aleutian)	*Branta hutchinsii leucopareia*	None	WL	2018	Very close
Redhead	*Aythya americana*	SSC2	SSC2		Very close
Barrow's goldeneye	*Bucephala islandica*	SSC	SSC		Very close

Common name	***Species name***		**Status[1]**		
		2011	**2026**		
Western grebe	*Aechmophorus occidentalis*		BCC	2021	Very close
Clark's grebe	*Aechmophorus clarkii*		BCC	2021	Nearby
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FC, CE, BCC	FT, CE	2014	In region
Black swift	*Cypseloides niger*	BCC, SSC3	BCC, SSC3		Nearby
Vaux's swift	*Chaetura vauxi*	SSC2	SSC2		Very close
Costa's hummingbird	*Calypte costae*	BCC	BCC		Nearby
Calliope hummingbird	*Selasphorus calliope*		BCC	2021	Nearby
Rufous hummingbird	*Selasphorus rufus*	BCC	BCC		Very close
Allen's hummingbird	*Selasphorus sasin*	BCC	BCC		In region
Lesser sandhill crane	*Antigone canadensis canadensis*	SSC3	SSC3		Very close
Greater sandhill crane	*Antigone canadensis tabida*	CT, CFP	CT, CFP		In region
American avocet	*Recurvirostra americana*		BCC	2021	Very close
Mountain plover	*Charadrius montanus*	FP, BCC, SSC2	BCC, SSC2		In region
Snowy plover	*Charadrius nivosus*	BCC	BCC[2]		In region
Western snowy plover	*Charadrius nivosus nivosus*	FT, BCC, SSC	FT, BCC, SSC		In region
Long-billed curlew	*Numenius americanus*	BCC, WL	WL		Nearby
Marbled godwit	*Limosa fedoa*	BCC	BCC		Nearby
Pectoral sandpiper	*Calidris melanotos*		BCC	2021	In region
Short-billed dowitcher	*Limnodromus griseus*	BCC	BCC		In region
Lesser yellowlegs	*Tringa flavipes*		BCC	2021	Very close
Willet	*Tringa semipalmata*		BCC	2021	In region
Franklin's gull	*Leucophaeus pipixcan*		BCC	2021	In region
Heermann's gull	*Larus heermanni*		BCC	2021	In region
Western gull	*Larus occidentalis*		BCC	2021	Nearby
California gull	*Larus californicus*	WL	BCC, WL	2021	Very close
California least tern	*Sternula antillarum browni*	FE, CE, CFP	FE, CE, CFP		In region
Black tern	*Chlidonias niger*	SSC2	SSC2, BCC	2021	Nearby
Common loon	*Gavia immer*	SSC	SSC		Nearby

Common name	***Species name***		**Status**[1]		
		2011	**2026**		
Double-crested cormorant	*Phalacrocorax auritus*	WL	WL		Very close
American white pelican	*Pelacanus erythrorhynchos*	SSC1	BCC, SSC1	2021	Very close
Least bittern	*Ixobrychus exilis*	BCC[3], SSC2	SSC2		In region
White-faced ibis	*Plegadis chihi*	WL	WL		Very close
Osprey	*Pandion haliaetus*	WL	WL		Very close
White-tailed kite	*Elanus luecurus*	CFP	CFP		On site
Golden eagle	*Aquila chrysaetos*	BCC[2], CFP, WL	CFP, WL		On site
Northern harrier	*Circus cyaneus*	SSC3	BCC, SSC3	2021	**On site**
Sharp-shinned hawk	*Accipiter striatus*	WL	WL		Very close
Cooper's hawk	*Accipiter cooperii*	WL	WL		Very close
American goshawk	*Accipiter atricapillus*	SSC2	SSC2		In region
Bald eagle	*Haliaeetus leucocephalus*	BCC, CE, CFP	CE, CFP		On site
Swainson's hawk	*Buteo swainsoni*	BCC[3], CT	CT		Very close
Ferruginous hawk	*Buteo regalis*	BCC[4], WL	WL		On site
California spotted owl	*Strix occidentalis occidentalis*	BCC, SSC	BCC, SSC		In region
Burrowing owl	*Athene cunicularia*	BCC, SSC2	BCC, CCE, SSC2	2025	**On site**
Long-eared owl	*Asio otus*	SSC3	BCC, SSC3,	2021	In region
Short-eared owl	*Asia flammeus*	SSC3	BCC, SSC3,	2021	Nearby
Lewis's woodpecker	*Melanerpes lewis*	BCC	BCC		On site
Nuttall's woodpecker	*Picoides nuttallii*	BCC	BCC		On site
White-headed woodpecker	*Dryobates albolarvatus*	BCC	BCC		In region
Merlin	*Falco columbarius*	WL	WL		On site
Peregrine falcon	*Falco peregrinus*	BCC, CFP			Very close
Prairie falcon	*Falco mexicanus*	BCC[3], WL	WL		On site
Olive-sided flycatcher	*Contopus cooperi*	BCC, SSC2	BCC, SSC2	2011	Very close
Willow flycatcher	*Empidonax trailii*	BCC, CE	CE		Very close
Vermilion flycatcher	*Pyrocephalus rubinus*	SSC2	SSC2		In region
Least Bell's vireo	*Vireo bellii pusillus*	FE, CE	FE, CE		In region

Common name	***Species name***		**Status**[1]		
		2011	**2026**		
Loggerhead shrike	*Lanius ludovicianus*	BCC, SSC2	SSC2		On site
Yellow-billed magpie	*Pica nuttalli*	BCC	BCC		On site
Oak titmouse	*Baeolophus inornatus*	BCC	BCC		On site
California horned lark	*Eremophila alpestris actia*	WL	WL		On site
Bank swallow	*Riparia riparia*	CT	CT		Nearby
Purple martin	*Progne subis*	SSC2	SSC2		Very close
Wrentit	*Chamaea fasciata*		BCC	2021	Very close
California thrasher	*Toxostoma redivivum*		BCC	2021	Nearby
Cassin's finch	*Haemorhous cassinii*		BCC	2021	Nearby
Lawrence's goldfinch	*Spinus lawrencei*	BCC	BCC		Very close
Grasshopper sparrow	*Ammodramus savannarum*	SSC2	SSC2		Nearby
Black-chinned sparrow	*Spizella atrogularis*	BCC	BCC		In region
Bell's sparrow	*Amphispiza b. belli*	BCC, WL	WL		Nearby
Oregon vesper sparrow	*Pooecetes gramineus affinis*	BCC, SSC2	BCC, SSC2		Very close
Modesto song sparrow	*Melospiza melodia mailliardi*	BCC[3], SSC1	SSC3		On site
Yellow-breasted chat	*Icteria virens*	SSC3	SSC3		Nearby
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	SSC3	SSC3		On site
Bullock's oriole	*Icterus bullockii*		BCC	2021	Very close
Tricolored blackbird	*Agelaius tricolor*	BCC, SSC1	CT, BCC, SSC1	2018	On site
Virginia's warbler	*Leiothlypis virginiae*	BCC, WL	BCC, WL		In region
Northern yellow warbler	*Setophaga aestiva*	BCC, SSC2	SSC2		Very close
Summer tanager	*Piranga rubra*	SSC1	SSC1		Nearby
Little brown bat	*Myotis lucifugus*	WBWG:M	None		**In region**
Yuma myotis	*Myotis yumanensis*	WBWG:LM	None		**In region**
Long-eared myotis	*Myotis evotis*	WBWG:M	None		In range
Fringed myotis	*Myotis thysanodes*	WBWG:H	None		In range
Long-legged myotis	*Myotis volans*	WBWG:H	None		In range
Small-footed myotis	*Myotis ciliolabrum*	WBWG:M	None		**In region**
Canyon bat	*Parastrellus hesperus*	WBWG:M	None		**In region**

Common name	***Species name***		**Status**[1]		
		2011	**2026**		
Silver-haired bat	*Lasionycteris noctivagans*	WBWG:M	None		**In region**
Hoary bat	*Lasiurus cinereus*	WBWG:M	None		In region
Western red bat	*Lasiurus blossevillii*	SSC, WBWG:H	SSC		**In region**
Townsend's big-eared bat	*Corynorhinus townsendii*	SSC, WBWG:H	SSC		In region
Spotted bat	*Euderma maculatum*	SSC, WBWG:H	SSC		In range
Pallid bat	*Antrozous pallidus*	SSC, WBWG:H	SSC		**In region**
Western mastiff bat	*Eumops perotis*	SSC, WBWG:H	SSC		**In region**
Ringtail	*Bassariscus astutus*	CFP[5]	CFP		In region
Sacramento Valley red fox	*Vulpes vulpes patwin*		None		In region
American badger	*Taxidea taxus*	SSC	SSC		In region
Mountain lion	*Puma concolor*	SA[6]	SA		In region

[1] Listed on CDFW's Special Animals List (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406) as None = on the List, but no special-status listing is reported; FT or FE = federal threatened or endangered; FC = federal candidate for listing; FP = federal proposed for listing; BGEPA = Bald and Golden Eagle Protection Act; BCC = U.S. Fish and Wildlife Service's Bird of Conservation Concern (https://www.fws.gov/sites/default/files/documents/birds-of-conservation-concern-2021.pdf); CT or CE = California threatened or endangered; CCT or CCE = Candidate California threatened or endangered; CFP = California Fully Protected (California Fish and Game Code 3511); SSC_i = California Species of Special Concern with i = priorities 1, 2 and 3; WL = CDFW's Taxa to Watch List; WBWG = Western Bat Working Group with priority rankings, of low (L), moderate (M) and high (H); and SA = Specially Protected Mammal under California Wildlife Protection Act of 1990.

[2] Does not appear on 2026 Special Animals List as BCC, but it is listed by USFWS as BCC.

[3] Listed on 2011 Special Animals List as BCC, but it did not appear on 2008 USFWS BCC list.

[4] BCC listing applied only to desert region.

[5] Does not appear on 2011 Special Animals List other than to report that ringtail is not tracked by CNDDB. Nonetheless, it was a California Fully Protected Species at the time.

[6] Mountain lion (other than the Yuma subspecies) does not appear on the 2011 Special Animals List even though it was a Special Animal at the time.

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puma@dcn.org

Born May 3, 1963 in
Sacramento, California.
Married, father of two.

Ecologist

Expertise

- Finding solutions to controversial problems related to wildlife interactions with human industry, infrastructure, and activities;
- Wildlife monitoring and field study using GPS, thermal imaging, behavior surveys;
- Using systems analysis and experimental design principles to identify meaningful ecological patterns that inform management decisions.

Education

Ph.D. Ecology, University of California, Davis. September 1990.
M.S. Ecology, University of California, Davis. June 1987.
B.S. Anthropology, University of California, Davis. June 1985.
Corcoran High School, Corcoran, California. June 1981.

Experience

- 762 professional reports, including:
- 90 peer reviewed publications
- 24 in non-reviewed proceedings
- 646 reports, declarations, posters and book reviews
- 8 in mass media outlets
- 92 public presentations of research results

Editing for scientific journals: Guest Editor, *Wildlife Society Bulletin*, 2012-2013, of invited papers representing international views on the impacts of wind energy on wildlife and how to mitigate the impacts. Associate Editor, *Journal of Wildlife Management*, March 2004 to 30 June 2007. Editorial Board Member, *Environmental Management*, 10/1999 to 8/2004. Associate Editor, *Biological Conservation*, 9/1994 to 9/1995.

Member, Alameda County Scientific Review Committee (SRC), August 2006 to April 2011. The five-member committee investigated causes of bird and bat collisions in the Altamont Pass Wind Resource Area, and recommended mitigation and monitoring measures. The SRC reviewed the science underlying the Alameda County Avian Protection Program, and advised

the County on how to reduce wildlife fatalities.

Consulting Ecologist, 2004-2007, California Energy Commission (CEC). Provided consulting services as needed to the CEC on renewable energy impacts, monitoring and research, and produced several reports. Also collaborated with Lawrence-Livermore National Lab on research to understand and reduce wind turbine impacts on wildlife.

Consulting Ecologist, 1999-2013, U.S. Navy. Performed endangered species surveys, hazardous waste site monitoring, and habitat restoration for the endangered San Joaquin kangaroo rat, California tiger salamander, California red-legged frog, California clapper rail, western burrowing owl, salt marsh harvest mouse, and other species at Naval Air Station Lemoore; Naval Weapons Station, Seal Beach, Detachment Concord; Naval Security Group Activity, Skaggs Island; National Radio Transmitter Facility, Dixon; and, Naval Outlying Landing Field Imperial Beach.

Part-time Lecturer, 1998-2005, California State University, Sacramento. Instructed Mammalogy, Behavioral Ecology, and Ornithology Lab, Contemporary Environmental Issues, Natural Resources Conservation.

Senior Ecologist, 1999-2005, BioResource Consultants. Designed and implemented research and monitoring studies related to avian fatalities at wind turbines, avian electrocutions on electric distribution poles across California, and avian fatalities at transmission lines.

Chairman, Conservation Affairs Committee, The Wildlife Society--Western Section, 1999-2001. Prepared position statements and led efforts directed toward conservation issues, including travel to Washington, D.C. to lobby Congress for more wildlife conservation funding.

Systems Ecologist, 1995-2000, Institute for Sustainable Development. Headed ISD's program on integrated resources management. Developed indicators of ecological integrity for large areas, using remotely sensed data, local community involvement and GIS.

Associate, 1997-1998, Department of Agronomy and Range Science, University of California, Davis. Worked with Shu Geng and Mingua Zhang on several studies related to wildlife interactions with agriculture and patterns of fertilizer and pesticide residues in groundwater across a large landscape.

Lead Scientist, 1996-1999, National Endangered Species Network. Informed academic scientists and environmental activists about emerging issues regarding the Endangered Species Act and other environmental laws. Testified at public hearings on endangered species issues.

Ecologist, 1997-1998, Western Foundation of Vertebrate Zoology. Conducted field research to determine the impact of past mercury mining on the status of California red-legged frogs in Santa Clara County, California.

Senior Systems Ecologist, 1994-1995, EIP Associates, Sacramento, California. Provided consulting services in environmental planning, and quantitative assessment of land units for their conservation and restoration opportunities basedon ecological resource requirements of 29 special-status species. Developed ecological indicators for prioritizing areas within Yolo County

to receive mitigation funds for habitat easements and restoration.

Post-Graduate Researcher, 1990-1994, Department of Agronomy and Range Science, *U.C. Davis*. Under Dr. Shu Geng's mentorship, studied landscape and management effects on temporal and spatial patterns of abundance among pocket gophers and species of Falconiformes and Carnivora in the Sacramento Valley. Managed and analyzed a data base of energy use in California agriculture. Assisted with landscape (GIS) study of groundwater contamination across Tulare County, California.

Work experience in graduate school: Co-taught Conservation Biology with Dr. Christine Schonewald, 1991 & 1993, UC Davis Graduate Group in Ecology; Reader for Dr. Richard Coss's course on Psychobiology in 1990, UC Davis Department of Psychology; Research Assistant to Dr. Walter E. Howard, 1988-1990, UC Davis Department of Wildlife and Fisheries Biology, testing durable baits for pocket gopher management in forest clearcuts; Research Assistant to Dr. Terrell P. Salmon, 1987-1988, UC Wildlife Extension, Department of Wildlife and Fisheries Biology, developing empirical models of mammal and bird invasions in North America, and a rating system for priority research and control of exotic species based on economic, environmental and human health hazards in California. Student Assistant to Dr. E. Lee Fitzhugh, 1985-1987, UC Cooperative Extension, Department of Wildlife and Fisheries Biology, developing and implementing statewide mountain lion track count for long-term monitoring.

Fulbright Research Fellow, Indonesia, 1988. Tested use of new sampling methods for numerical monitoring of Sumatran tiger and six other species of endemic felids, and evaluated methods used by other researchers.

Projects

Repowering wind energy projects through careful siting of new wind turbines using map-based collision hazard models to minimize impacts to volant wildlife. Funded by wind companies (principally NextEra Renewable Energy, Inc.), California Energy Commission and East Bay Regional Park District, I have collaborated with a GIS analyst and managed a crew of five field biologists performing golden eagle behavior surveys and nocturnal surveys on bats and owls. The goal is to quantify flight patterns for development of predictive models to more carefully site new wind turbines in repowering projects. Focused behavior surveys began May 2012 and continue. Collision hazard models have been prepared for seven wind projects, three of which were built. Planning for additional repowering projects is underway.

Test avian safety of new mixer-ejector wind turbine (MEWT). Designed and implemented a before-after, control-impact experimental design to test the avian safety of a new, shrouded wind turbine developed by Ogin Inc. (formerly known as FloDesign Wind Turbine Corporation). Supported by a $718,000 grant from the California Energy Commission's Public Interest Energy Research program and a 20% match share contribution from Ogin, I managed a crew of seven field biologists who performed periodic fatality searches and behavior surveys, carcass detection trials, nocturnal behavior surveys using a thermal camera, and spatial analyses with the collaboration of a GIS analyst. Field work began 1 April 2012 and ended 30 March 2015 without Ogin installing its MEWTs, but we still achieved multiple important scientific advances.

Reduce avian mortality due to wind turbines at Altamont Pass. Studied wildlife impacts caused by 5,400 wind turbines at the world's most notorious wind resource area. Studied how impacts are perceived by monitoring and how they are affected by terrain, wind patterns, food resources, range management practices, wind turbine operations, seasonal patterns, population cycles, infrastructure management such as electric distribution, animal behavior and social interactions.

Reduce avian mortality on electric distribution poles. Directed research toward reducing bird electrocutions on electric distribution poles, 2000-2007. Oversaw 5 founds of fatality searches at 10,000 poles from Orange County to Glenn County, California, and produced two large reports.

Cook *et al*. v. Rockwell International *et al*., No. 90-K-181 (D. Colorado). Provided expert testimony on the role of burrowing animals in affecting the fate of buried and surface-deposited radioactive and hazardous chemical wastes at the Rocky Flats Plant, Colorado. Provided expert reports based on four site visits and an extensive document review of burrowing animals. Conducted transect surveys for evidence of burrowing animals and other wildlife on and around waste facilities. Discovered substantial intrusion of waste structures by burrowing animals. I testified in federal court in November 2005, and my clients were subsequently awarded a $553,000,000 judgment by a jury. After appeals the award was increased to two billion dollars.

Hanford Nuclear Reservation Litigation. Provided expert testimony on the role of burrowing animals in affecting the fate of buried radioactive wastes at the Hanford Nuclear Reservation, Washington. Provided three expert reports based on three site visits and extensive document review. Predicted and verified a certain population density of pocket gophers on buried waste structures, as well as incidence of radionuclide contamination in body tissue. Conducted transect surveys for evidence of burrowing animals and other wildlife on and around waste facilities. Discovered substantial intrusion of waste structures by burrowing animals.

Expert testimony and declarations on proposed residential and commercial developments, gas-fired power plants, wind, solar and geothermal projects, water transfers and water transfer delivery systems, endangered species recovery plans, Habitat Conservation Plans and Natural Communities Conservation Programs. Testified before multiple government agencies, Tribunals, Boards of Supervisors and City Councils, and participated with press conferences and depositions. Prepared expert witness reports and court declarations, which are summarized under Reports (below).

Protocol-level surveys for special-status species. Used California Department of Fish and Wildlife and US Fish and Wildlife Service protocols to search for California red-legged frog, California tiger salamander, arroyo southwestern toad, blunt-nosed leopard lizard, western pond turtle, giant kangaroo rat, San Joaquin kangaroo rat, San Joaquin kit fox, western burrowing owl, Swainson's hawk, Valley elderberry longhorn beetle and other special-status species.

Conservation of San Joaquin kangaroo rat. Performed research to identify factors responsible for the decline of this endangered species at Lemoore Naval Air Station, 2000-2013, and implemented habitat enhancements designed to reverse the trend and expand the population.

Impact of West Nile Virus on yellow-billed magpies. Funded by Sacramento-Yolo Mosquito and Vector Control District, 2005-2008, compared survey results pre- and post-West Nile Virus epidemic for multiple bird species in the Sacramento Valley, particularly on yellow-billed magpie and American crow due to susceptibility to WNV.

Workshops on HCPs. Assisted Dr. Michael Morrison with organizing and conducting a 2-day workshop on Habitat Conservation Plans, sponsored by Southern California Edison, and another 1-day workshop sponsored by PG&E. These Workshops were attended by academics, attorneys, and consultants with HCP experience. We guest-edited a Proceedings published in Environmental Management.

Mapping of biological resources along Highways 101, 46 and 41. Used GPS and GIS to delineate vegetation complexes and locations of special-status species along 26 miles of highway in San Luis Obispo County, 14 miles of highway and roadway in Monterey County, and in a large area north of Fresno, including within reclaimed gravel mining pits.

GPS mapping and monitoring at restoration sites and at Caltrans mitigation sites. Monitored the success of elderberry shrubs at one location, the success of willows at another location, and the response of wildlife to the succession of vegetation at both sites. Also used GPS to monitor the response of fossorial animals to yellow star-thistle eradication and natural grassland restoration efforts at Bear Valley in Colusa County and at the decommissioned Mather Air Force Base in Sacramento County.

Mercury effects on Red-legged Frog. Assisted Dr. Michael Morrison and US Fish and Wildlife Service in assessing the possible impacts of historical mercury mining on the federally listed California red-legged frog in Santa Clara County. Also measured habitat variables in streams.

Opposition to proposed No Surprises rule. Wrote a white paper and summary letter explaining scientific grounds for opposing the incidental take permit (ITP) rules providing ITP applicants and holders with general assurances they will be free of compliance with the Endangered Species Act once they adhere to the terms of a "properly functioning HCP." Submitted 188 signatures of scientists and environmental professionals concerned about No Surprises rule US Fish and Wildlife Service, National Marine Fisheries Service, all US Senators.

Natomas Basin Habitat Conservation Plan alternative. Designed narrow channel marsh to increase the likelihood of survival and recovery in the wild of giant garter snake, Swainson's hawk and Valley Elderberry Longhorn Beetle. The design included replication and interspersion of treatments for experimental testing of critical habitat elements. I provided a report to Northern Territories, Inc.

Assessments of agricultural production system and environmental technology transfer to China. Twice visited China and interviewed scientists, industrialists, agriculturalists, and the Directors of the Chinese Environmental Protection Agency and the Department of Agriculture to assess the need and possible pathways for environmental clean-up technologies and trade opportunities between the US and China.

Yolo County Habitat Conservation Plan. Conducted landscape ecology study of Yolo County to spatially prioritize allocation of mitigation efforts to improve ecosystem functionality within the County from the perspective of 29 special-status species of wildlife and plants. Used a hierarchically structured indicators approach to apply principles of landscape and ecosystem ecology, conservation biology, and local values in rating land units. Derived GIS maps to help guide the conservation area design, and then developed implementation strategies.

Mountain lion track count. Developed and conducted a carnivore monitoring program throughout California since 1985. Species counted include mountain lion, bobcat, black bear, coyote, red and gray fox, raccoon, striped skunk, badger, and black-tailed deer. Vegetation and land use are also monitored. Track survey transect was established on dusty, dirt roads within randomly selected quadrats.

Sumatran tiger and other felids. Upon award of Fulbright Research Fellowship, I designed and initiated track counts for seven species of wild cats in Sumatra, including Sumatran tiger, fishing cat, and golden cat. Spent four months on Sumatra and Java in 1988, and learned Bahasa Indonesia, the official Indonesian language.

Wildlife in agriculture. Beginning as post-graduate research, I studied pocket gophers and other wildlife in 40 alfalfa fields throughout the Sacramento Valley, and I surveyed for wildlife along a 200 mile road transect since 1989 with a hiatus of 1996-2004. The data are analyzed using GIS and methods from landscape ecology, and the results published and presented orally to farming groups in California and elsewhere. I also conducted the first study of wildlife in cover crops used on vineyards and orchards.

Agricultural energy use and Tulare County groundwater study. Developed and analyzed a data base of energy use in California agriculture, and collaborated on a landscape (GIS) study of groundwater contamination across Tulare County, California.

Pocket gopher damage in forest clear-cuts. Developed gopher sampling methods and tested various poison baits and baiting regimes in the largest-ever field study of pocket gopher management in forest plantations, involving 68 research plots in 55 clear-cuts among 6 National Forests in northern California.

Risk assessment of exotic species in North America. Developed empirical models of mammal and bird species invasions in North America, as well as a rating system for assigning priority research and control to exotic species in California, based on economic, environmental, and human health hazards.

Peer Reviewed Publications

Smallwood, K. S. 2022. Utility-scale solar impacts to volant wildlife. Journal of Wildlife Management: e22216. https://doi.org/10.1002/jwmg.22216

Smallwood, K. S., and N. L. Smallwood. 2021. Breeding Density and Collision Mortality of Loggerhead Shrike (*Lanius ludovicianus*) in the Altamont Pass Wind Resource Area. Diversity 13, 540. https://doi.org/10.3390/d13110540.

Smallwood, K. S. 2020. USA wind energy-caused bat fatalities increase with shorter fatality search intervals. Diversity 12(98); https://doi.org/10.3390/d12030098

Smallwood, K. S., D. A. Bell, and S. Standish. 2020. Dogs detect larger wind energy impacts on bats and birds. Journal of Wildlife Management 84:852-864. DOI: 10.1002/jwmg.21863.

Smallwood, K. S., and D. A. Bell. 2020. Relating bat passage rates to wind turbine fatalities.

Diversity 12(84); doi:10.3390/d12020084.

Smallwood, K. S., and D. A. Bell. 2020. Effects of wind turbine curtailment on bird and bat fatalities. Journal of Wildlife Management 84:684-696. DOI: 10.1002/jwmg.21844

Kitano, M., M. Ino, K. S. Smallwood, and S. Shiraki. 2020. Seasonal difference in carcass persistence rates at wind farms with snow, Hokkaido, Japan. Ornithological Science 19: 63 – 71.

Smallwood, K. S. and M. L. Morrison. 2018. Nest-site selection in a high-density colony of burrowing owls. Journal of Raptor Research 52:454-470.

Smallwood, K. S., D. A. Bell, E. L. Walther, E. Leyvas, S. Standish, J. Mount, B. Karas. 2018. Estimating wind turbine fatalities using integrated detection trials. Journal of Wildlife Management 82:1169-1184.

Smallwood, K. S. 2017. Long search intervals under-estimate bird and bat fatalities caused by wind turbines. Wildlife Society Bulletin 41:224-230.

Smallwood, K. S. 2017. The challenges of addressing wildlife impacts when repowering wind energy projects. Pages 175-187 in Köppel, J., Editor, Wind Energy and Wildlife Impacts: Proceedings from the CWW2015 Conference. Springer. Cham, Switzerland.

May, R., Gill, A. B., Köppel, J. Langston, R. H.W., Reichenbach, M., Scheidat, M., Smallwood, S., Voigt, C. C., Hüppop, O., and Portman, M. 2017. Future research directions to reconcile wind turbine–wildlife interactions. Pages 255-276 in Köppel, J., Editor, Wind Energy and Wildlife Impacts: Proceedings from the CWW2015 Conference. Springer. Cham, Switzerland.

Smallwood, K. S. 2017. Monitoring birds. M. Perrow, Ed., Wildlife and Wind Farms - Conflicts and Solutions, Volume 2. Pelagic Publishing, Exeter, United Kingdom. www.bit.ly/2v3cR9Q

Smallwood, K. S., L. Neher, and D. A. Bell. 2017. Turbine siting for raptors: an example from Repowering of the Altamont Pass Wind Resource Area. M. Perrow, Ed., Wildlife and Wind Farms - Conflicts and Solutions, Volume 2. Pelagic Publishing, Exeter, United Kingdom. www.bit.ly/2v3cR9Q

Johnson, D. H., S. R. Loss, K. S. Smallwood, W. P. Erickson. 2016. Avian fatalities at wind energy facilities in North America: A comparison of recent approaches. Human–Wildlife Interactions 10(1):7-18.

Sadar, M. J., D. S.-M. Guzman, A. Mete, J. Foley, N. Stephenson, K. H. Rogers, C. Grosset, K. S. Smallwood, J. Shipman, A. Wells, S. D. White, D. A. Bell, and M. G. Hawkins. 2015. Mange Caused by a novel Micnemidocoptes mite in a Golden Eagle (*Aquila chrysaetos*). Journal of Avian Medicine and Surgery 29(3):231-237.

Smallwood, K. S. 2015. Habitat fragmentation and corridors. Pages 84-101 in M. L. Morrison and H. A. Mathewson, Eds., Wildlife habitat conservation: concepts, challenges, and solutions. John Hopkins University Press, Baltimore, Maryland, USA.

EXHIBIT B

June 6, 2026
26235-00

Michael Lozeau
Lozeau Drury LLP
1939 Harrison St., Suite 150
Oakland, CA 94612

Subject: Review of Air Quality Impacts Analyzed for Toll Brothers at Alder Creek Project

Dear Mr. Lozeau:

Baseline Environmental Consulting (Baseline) has reviewed the Conformity Analysis[1] for the Toll Brothers at Alder Creek Project (project) in the southeastern portion of the City of Folsom (City). The project proposes to construct 1,424 single-family homes in accordance with the Folsom Plan Area Specific Plan (FPASP). The purpose of the Conformity Analysis was to identify and assess project compliance with the program-level FPASP Environmental Impact Report and Environmental Impact Statement (EIR/EIS) that was approved in 2011.[2] Pursuant to CEQA Guidelines Section 15182, the Conformity Analysis evaluated if any of the events described in CEQA Guidelines Section 15162 (Subsequent EIRs and Negative Declarations) have occurred and were not considered in the FPASP. The purpose of our review was to determine whether additional mitigation measures can be incorporated into the proposed project to reduce the severity of significant air quality impacts identified in the FPASP EIR/EIS.

Long-term Criteria Air Pollutant Emissions

The analysis under the FPASP EIR/EIS found that the long-term increase of criteria air pollutants resulting from implementation of the FPASP would be a ***significant and unavoidable impact***. As described in the Conformity Analysis, the project would comply with mitigation measure 3A.2-2 from the FPASP EIR/EIS, which requires the project to implement all measures prescribed in the 2009 FPASP Air Quality Mitigation Plan (AQMP). As stated on page 3-23 of the Conformity Analysis, the AQMP includes the following measures:

- Provide bicycle parking at commercial land uses.
- Provide integrated pedestrian/bicycle path network.

[1] ECORP Consulting, Inc., 2025. Section 15182 and 15162 Conformity Analysis for the Toll Brothers Property, Alder Creek Subdivision Tentative Map, City of Folsom, California. August.
[2] AECOM and RMC Water and Environment, 2011. Final EIR/EIS, Folsom South of U.S. Highway 50 Specific Plan Project, SCH #2008092051. May.

- Provide transit stops with shelters.
- Prohibit the use the wood-burning fireplaces.
- Require Energy Star roofing materials.
- Provide electric lawn mowers provided to homeowners at no charge.
- Provide on-site transportation alternatives to passenger vehicles (including light rail) that provide connectivity with other local and regional alternative transportation networks.

Many of these measures from the 2009 AQMP do not appear to be directly applicable to development of proposed 1,424 single-family homes and it's unclear how the project's compliance with the 2009 AQMP would reduce the severity of the significant and unavoidable impact identified in the FPASP EIR/EIS for long-term emissions of criteria air pollutants. As discussed below, there are additional mitigation measures that could be evaluated and implemented under the proposed project that were not considered and/or were not readily available when the FPASP EIR/EIS was certified in 2011.

New Mitigation Measures

Vehicle emissions were identified as a substantial source of long-term criteria air pollutant emissions in the Folsom Plan Area for which the FPASP EIR/EIS identified as a ***significant and unavoidable impact***. According to the California Energy Commission, access to home charging for electric vehicles (EV) is a critical strategy to encourage the electrification of California's transportation system and lower fleetwide vehicle emissions, particularly access to faster Level 2 EV chargers as the battery sizes and ranges of EVs continue to increase.[3]

Under the current California Energy Code (2025), newly constructed single-family homes are required to be equipped with solar photovoltaic systems designed to offset the home's annual electricity usage. To maximize solar efficiency, the project could integrate the solar photovoltaic system for each home with a battery electric storage system and Level 2 EV charger to encourage the adoption of EV vehicles and substantially reduce the overall criteria air pollutant emissions from vehicles in the Folsom Plan Area. To reduce the severity of this impact, Baseline recommends that the project implement the following mitigation measure (or similar):

- **New Mitigation Measure 1.** For each single-family dwelling unit, at least one Level 2 EV charger shall be installed with a dedicated 208/240-volt 40-ampere branch circuit between the main service or subpanel and a listed cabinet, box or other enclosure near the Level 2 EV charger. A battery electric storage system designed to support the Level 2 EV charger shall be installed and integrated with the solar photovoltaic system required for the dwelling unit.

[3] California Energy Commission, 2022. Staff Report, Home Charging Access in California, CEC-600-2022-021. January.

Architectural coatings are a major source of reactive organic gas (ROG) emissions, a precursor for the formation of ground-level ozone, which the FPASP EIR/EIS identified as a ***significant and unavoidable impact***. Under Sacramento Metropolitan Air Quality Management District Rule 442, all interior and exterior architectural coatings of paint for newly constructed single-family homes are limited to a maximum volatile organic compound (VOC) content of 50 grams per liter. In recent years, paint manufacturers have developed super-compliant VOC paints with a maximum VOC content of 10 grams per liter for widespread use in California, which were not readily available when the FPASP EIR/EIS was certified in 2011. To reduce the severity of this impact, Baseline recommends that the project implement the following mitigation measure (or similar):

- **New Mitigation Measure 2.** During construction, super-compliant volatile organic compound (VOC) paints with a maximum VOC content of 10 grams per liter shall be used on the exterior and interior of each single-family dwelling unit. The project sponsor shall submit a signed certification statement to the City of Folsom Planning Department confirming that the super-compliant VOC requirement has been incorporated into the construction contract specifications, for review and approval.

According to 14 CCR 15162 (a)(3)(D), additional CEQA review is required if mitigation measures which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment. As described above, there are readily available mitigation measures that would substantially reduce long-term emissions of criteria air pollutants related to the proposed project; therefore, additional CEQA review of the project is warranted to evaluate, mitigate, and disclose the severity of potential air quality impacts to the public.

Conclusion

Based on our review of the Conformity Analysis and FPASP EIR/EIS, the significant and unavoidable impacts related to long-term criteria air pollutant emissions can be substantially reduced with the incorporation of new mitigation measures into the project design. In accordance with 14 CCR 15162 (a)(3)(D), additional CEQA review of the project is required to evaluate, mitigate, and disclose the severity of potential air quality impacts to the public.

Sincerely,

Patrick Sutton
Principal Environmental Engineer

ATTACHMENT A

Staff Resume

Patrick Sutton, P.E.

Principal Environmental Engineer

Areas of Expertise

Air Quality, GHGs, Noise, Hazardous Materials, Geology, and Hydrology

Education

M.S., Civil and Environmental Engineering, University of California – Davis

B.S., Environmental Science, Dickinson College

Registration

Professional Engineer No. 13609 (RI)

Years of Experience

20 Years

Patrick Sutton is an environmental engineer who specializes in the assessment of hazardous materials released into the environment. Mr. Sutton prepares technical reports in support of environmental review, such as Phase I/II Environmental Site Investigations, Air Quality Reports, and Health Risk Assessments. He has prepared numerous CEQA/NEPA evaluations for air quality, GHGs, noise, energy, geology, hazardous materials, and water quality related to residential, commercial, and industrial projects, as well as large infrastructure developments. His proficiency in a wide range of modeling software (AERMOD, CalEEMod, RCEM, CT-EMFAC) as well as relational databases, GIS, and graphics design allows him to thoroughly and efficiently assess and mitigate environmental concerns.

For mixed-use development projects, Mr. Sutton has prepared health risk assessments for sensitive receptors exposed to toxic air contaminants based on air dispersion modeling. For large transportation improvement projects, Mr. Sutton has prepared air quality and hazardous materials technical reports in accordance with Caltrans requirements. The air quality assessments include the evaluation of criteria air pollutants, mobile source air toxics, and GHG emissions to support environmental review of the project under CEQA/NEPA and to determine conformity with the State Implementation Plan. The hazardous materials investigations include sampling and statistically analysis of aerially-deposited lead adjacent to highway corridors. Mr. Sutton is also an active member of ASTM International and is the author of the Standard Practice for Low-Flow Purging and Sampling Used for Groundwater Monitoring.

Project Experience

Alameda CTC I-80/Ashby Avenue Interchange Improvements. Prepared Phase I/II ESAs to evaluate contaminants of potential concern in soil and groundwater. Prepared Air Quality Report to determine the project's conformity to federal air quality regulations and support CEQA/NEPA environmental review.

Oakland Downtown Specific Plan EIR. Prepared a program- and project-level Air Quality and GHG Emissions analysis. Developed a mitigation measure with performance standards to ensure GHG emissions from future projects comply with the Citywide 2030 GHG reduction target.

Alameda CTC I-680 Express Lanes from SR 84 to Alcosta Boulevard Project. Prepared Initial Site Assessment and Preliminary Site Investigation to evaluate contaminants of potential concern in soil and groundwater. Prepared Air Quality Report to determine the project's conformity to federal air quality regulations and to support environmental review of the project under CEQA and NEPA.

Altamont Corridor Expressway (ACE/Forward) Project EIR/EIS. Prepared a program- and project-level Hazardous Materials analysis for over 120 miles of railroad corridor from San Jose to Merced. Hazardous materials concerns, such as release sites, petroleum pipelines, agricultural pesticides, and nearby school sites were evaluated in GIS.

BART Silicon Valley Extension Project. Prepared Initial Site Assessment and Hazardous Materials EIS/EIR section for extending 6 miles of proposed BART service through the Cities of San Jose and Santa Clara.

EXHIBIT C

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Date: June 2, 2026

To: Michael Lozeau
Lozeau | Drury LLP
1939 Harrison Street, Suite 150
Oakland, California 94612

From: Francis J. Offermann PE CIH

Subject: Indoor Air Quality: Toll Brothers Property Project, Folsom, CA
(IEE File Reference: P-4960)

Pages: 18

Indoor Air Quality Impacts

I am writing this letter as there is new information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the Draft Environmental Impact Report (City of Sacramento, 2010), that shows the Project will have significant effects from formaldehyde emission not discussed in the previous DEIR. This new information relates to the recent Singer 2020 study that shows that new residences built with composite wood products that are CARB Phase 2 certified, do not ensure indoor formaldehyde concentrations that are below the CEQA cancer risk of 10 per million.

Indoor air quality (IAQ) directly impacts the comfort and health of building occupants, and the achievement of acceptable IAQ in newly constructed and renovated buildings is a well-recognized design objective. For example, IAQ is addressed by major high-performance building rating systems and building codes (California Building Standards Commission, 2014; USGBC, 2014). Indoor air quality in homes is particularly important because occupants, on average, spend approximately ninety percent of their time indoors with the

majority of this time spent at home (EPA, 2011). Some segments of the population that are most susceptible to the effects of poor IAQ, such as the very young and the elderly, occupy their homes almost continuously. Additionally, an increasing number of adults are working from home at least some of the time during the workweek. Indoor air quality also is a serious concern for workers in hotels, offices and other business establishments.

The concentrations of many air pollutants often are elevated in homes and other buildings relative to outdoor air because many of the materials and products used indoors contain and release a variety of pollutants to air (Hodgson et al., 2002; Offermann and Hodgson, 2011). With respect to indoor air contaminants for which inhalation is the primary route of exposure, the critical design and construction parameters are the provision of adequate ventilation and the reduction of indoor sources of the contaminants.

Indoor Formaldehyde Concentrations Impact. In the California New Home Study (CNHS) of 108 new homes in California (Offermann, 2009), 25 air contaminants were measured, and formaldehyde was identified as the indoor air contaminant with the highest cancer risk as determined by the California Proposition 65 Safe Harbor Levels (OEHHA, 2017a), No Significant Risk Levels (NSRL) for carcinogens. The NSRL is the daily intake level calculated to result in one excess case of cancer in an exposed population of 100,000 (i.e., ten in one million cancer risk) and for formaldehyde is 40 µg/day. The NSRL concentration of formaldehyde that represents a daily dose of 40 µg is 2 $\mu g/m^3$, assuming a continuous 24-hour exposure, a total daily inhaled air volume of 20 m^3, and 100% absorption by the respiratory system. All of the CNHS homes exceeded this NSRL concentration of 2 $\mu g/m^3$. The median indoor formaldehyde concentration was 36 $\mu g/m^3$, and ranged from 4.8 to 136 $\mu g/m^3$, which corresponds to a median exceedance of the 2 $\mu g/m^3$ NSRL concentration of 18 and a range of 2.3 to 68.

Therefore, the cancer risk of a resident living in a California home with the median indoor formaldehyde concentration of 36 $\mu g/m^3$, is 180 per million as a result of formaldehyde alone. The CEQA significance threshold for airborne cancer risk is 10 per million, as established by the Sacramento Metropolitan Air Quality Management District (SMAQMD, 2020).

Besides being a human carcinogen, formaldehyde is also a potent eye and respiratory irritant. In the CNHS, many homes exceeded the non-cancer reference exposure levels (RELs) prescribed by California Office of Environmental Health Hazard Assessment (OEHHA, 2017b). The percentage of homes exceeding the RELs ranged from 98% for the Chronic REL of 9 $\mu g/m^3$ to 28% for the Acute REL of 55 $\mu g/m^3$.

The primary source of formaldehyde indoors is composite wood products manufactured with urea-formaldehyde resins, such as plywood, medium density fiberboard, and particleboard. These materials are commonly used in building construction for flooring, cabinetry, baseboards, window shades, interior doors, and window and door trims.

In January 2009, the California Air Resources Board (CARB) adopted an airborne toxics control measure (ATCM) to reduce formaldehyde emissions from composite wood products, including hardwood plywood, particleboard, medium density fiberboard, and also furniture and other finished products made with these wood products (California Air Resources Board 2009). While this formaldehyde ATCM has resulted in reduced emissions from composite wood products sold in California, they do not preclude that homes built with composite wood products meeting the CARB ATCM will have indoor formaldehyde concentrations that are below cancer and non-cancer exposure guidelines.

A follow up study to the California New Home Study (CNHS) was conducted in 2016-2018 (Singer et. al., 2020) and found that the median indoor formaldehyde in new homes built after 2009 with CARB Phase 2 Formaldehyde ATCM materials had lower indoor formaldehyde concentrations, with a median indoor concentrations of 22.4 $\mu g/m^3$ (18.2 ppb) as compared to a median of 36 $\mu g/m^3$ found in the 2007 CNHS. Unlike in the CNHS study where formaldehyde concentrations were measured with pumped DNPH samplers, the formaldehyde concentrations in the HENGH study were measured with passive samplers, which were estimated to under-measure the true indoor formaldehyde concentrations by approximately 7.5%. Applying this correction to the HENGH indoor formaldehyde concentrations results in a median indoor concentration of 24.1 $\mu g/m^3$, which is 33% lower than the 36 $\mu g/m^3$ found in the 2007 CNHS.

Thus, while new homes built after the 2009 CARB formaldehyde ATCM have a 33% lower median indoor formaldehyde concentration and cancer risk, the median lifetime cancer risk is still 120 per million for homes built with CARB compliant composite wood products, which is more than 12 times the OEHHA 10 in a million cancer risk threshold (OEHHA, 2017a).

With respect to this Project, the buildings in the Toll Brothers Property Project, Folsom, CA consist of a residential spaces.

The residential occupants will potentially have continuous exposure (e.g. 24 hours per day, 52 weeks per year). These exposures are anticipated to result in significant cancer risks resulting from exposures to formaldehyde released by the building materials and furnishing commonly found in residential construction.

Because these residences will be constructed with CARB Phase 2 Formaldehyde ATCM materials, and be ventilated with the minimum code required amount of outdoor air, the indoor residential formaldehyde concentrations are likely similar to those concentrations observed in residences built with CARB Phase 2 Formaldehyde ATCM materials, which is a median of 24.1 $\mu g/m^3$ (Singer et. al., 2020)

Assuming that the residential occupants inhale 20 m^3 of air per day, the average 70-year lifetime formaldehyde daily dose is 482 µg/day for continuous exposure in the residences. This exposure represents a cancer risk of 120 per million, which is more than 12 times the CEQA cancer risk of 10 per million. For occupants that do not have continuous exposure, the cancer risk will be proportionally less but still substantially over the CEQA cancer risk of 10 per million (e.g. for 12/hour/day occupancy, more than 6 times the CEQA cancer risk of 10 per million).

In addition, we note that the average outdoor air concentration of formaldehyde in California is 3 ppb, or 3.7 $\mu g/m^3$, (California Air Resources Board, 2004), and thus represents an average pre-existing background airborne cancer risk of 1.85 per million.

Thus, the indoor air formaldehyde exposures describe above exacerbate this pre-existing risk resulting from outdoor air formaldehyde exposures.

Appendix A, Indoor Formaldehyde Concentrations and the CARB Formaldehyde ATCM, provides analyses that show utilization of CARB Phase 2 Formaldehyde ATCM materials will not ensure acceptable cancer risks with respect to formaldehyde emissions from composite wood products.

Even composite wood products manufactured with CARB certified ultra low emitting formaldehyde (ULEF) resins do not insure that the indoor air will have concentrations of formaldehyde the meet the OEHHA cancer risks that substantially exceed 10 per million. The permissible emission rates for ULEF composite wood products are only 11-15% lower than the CARB Phase 2 emission rates. Only use of composite wood products made with no-added formaldehyde resins (NAF), such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can insure that the OEHHA cancer risk of 10 per million is met.

The following describes a method that should be used prior to construction in the environmental review under CEQA, for determining whether the indoor concentrations resulting from the formaldehyde emissions of the specific building materials/furnishings selected for the building exceed cancer and non-cancer guidelines. Such a design analyses can be used to identify those materials/furnishings prior to the completion of the City's CEQA review and project approval, that have formaldehyde emission rates that contribute to indoor concentrations that exceed cancer and non-cancer guidelines, so that alternative lower emitting materials/furnishings may be selected and/or higher minimum outdoor air ventilation rates can be increased to achieve acceptable indoor concentrations and incorporated as mitigation measures for this project.

Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment.

This formaldehyde emissions assessment should be used in the environmental review under CEQA to assess the indoor formaldehyde concentrations from the proposed loading of building materials/furnishings, the area-specific formaldehyde emission rate data for

building materials/furnishings, and the design minimum outdoor air ventilation rates. This assessment allows the applicant (and the City) to determine before the conclusion of the environmental review process and the building materials/furnishings are specified, purchased, and installed if the total chemical emissions will exceed cancer and non-cancer guidelines, and if so, allow for changes in the selection of specific material/furnishings and/or the design minimum outdoor air ventilations rates such that cancer and non-cancer guidelines are not exceeded.

1.) Define Indoor Air Quality Zones. Divide the building into separate indoor air quality zones, (IAQ Zones). IAQ Zones are defined as areas of well-mixed air. Thus, each ventilation system with recirculating air is considered a single zone, and each room or group of rooms where air is not recirculated (e.g. 100% outdoor air) is considered a separate zone. For IAQ Zones with the same construction material/furnishings and design minimum outdoor air ventilation rates. (e.g. hotel rooms, apartments, condominiums, etc.) the formaldehyde emission rates need only be assessed for a single IAQ Zone of that type.

2.) Calculate Material/Furnishing Loading. For each IAQ Zone, determine the building material and furnishing loadings (e.g., m^2 of material/m^2 floor area, units of furnishings/m^2 floor area) from an inventory of all potential indoor formaldehyde sources, including flooring, ceiling tiles, furnishings, finishes, insulation, sealants, adhesives, and any products constructed with composite wood products containing urea-formaldehyde resins (e.g., plywood, medium density fiberboard, particleboard).

3.) Calculate the Formaldehyde Emission Rate. For each building material, calculate the formaldehyde emission rate (µg/h) from the product of the area-specific formaldehyde emission rate (µg/m^2-h) and the area (m^2) of material in the IAQ Zone, and from each furnishing (e.g. chairs, desks, etc.) from the unit-specific formaldehyde emission rate (µg/unit-h) and the number of units in the IAQ Zone.

NOTE: As a result of the high-performance building rating systems and building codes (California Building Standards Commission, 2014; USGBC, 2014), most manufacturers of building materials furnishings sold in the United States conduct chemical emission rate tests using the California Department of Health “Standard Method for the Testing and

Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers", (CDPH, 2017), or other equivalent chemical emission rate testing methods. Most manufacturers of building furnishings sold in the United States conduct chemical emission rate tests using ANSI/BIFMA M7.1 Standard Test Method for Determining VOC Emissions (BIFMA, 2018), or other equivalent chemical emission rate testing methods.

CDPH, BIFMA, and other chemical emission rate testing programs, typically certify that a material or furnishing does not create indoor chemical concentrations in excess of the maximum concentrations permitted by their certification. For instance, the CDPH emission rate testing requires that the measured emission rates when input into an office, school, or residential model do not exceed one-half of the OEHHA Chronic Exposure Guidelines (OEHHA, 2017b) for the 35 specific VOCs, including formaldehyde, listed in Table 4-1 of the CDPH test method (CDPH, 2017). These certifications themselves do not provide the actual area-specific formaldehyde emission rate (i.e., $\mu g/m^2$-h) of the product, but rather provide data that the formaldehyde emission rates do not exceed the maximum rate allowed for the certification. Thus for example, the data for a certification of a specific type of flooring may be used to calculate that the area-specific emission rate of formaldehyde is less than 31 $\mu g/m^2$-h, but not the actual measured specific emission rate, which may be 3, 18, or 30 $\mu g/m^2$-h. These area-specific emission rates determined from the product certifications of CDPH, BIFA, and other certification programs can be used as an initial estimate of the formaldehyde emission rate.

If the actual area-specific emission rates of a building material or furnishing is needed (i.e. the initial emission rates estimates from the product certifications are higher than desired), then that data can be acquired by requesting from the manufacturer the complete chemical emission rate test report. For instance if the complete CDPH emission test report is requested for a CDHP certified product, that report will provide the actual area-specific emission rates for not only the 35 specific VOCs, including formaldehyde, listed in Table 4-1 of the CDPH test method (CDPH, 2017), but also all of the cancer and reproductive/developmental chemicals listed in the California Proposition 65 Safe Harbor Levels (OEHHA, 2017a), all of the toxic air contaminants (TACs) in the California Air

Resources Board Toxic Air Contamination List (CARB, 2011), and the 10 chemicals with the greatest emission rates.

Alternatively, a sample of the building material or furnishing can be submitted to a chemical emission rate testing laboratory, such as Berkeley Analytical Laboratory (https://berkeleyanalytical.com), to measure the formaldehyde emission rate.

4.) Calculate the Total Formaldehyde Emission Rate. For each IAQ Zone, calculate the total formaldehyde emission rate (i.e. µg/h) from the individual formaldehyde emission rates from each of the building material/furnishings as determined in Step 3.

5.) Calculate the Indoor Formaldehyde Concentration. For each IAQ Zone, calculate the indoor formaldehyde concentration (µg/m^3) from Equation 1 by dividing the total formaldehyde emission rates (i.e. µg/h) as determined in Step 4, by the design minimum outdoor air ventilation rate (m^3/h) for the IAQ Zone.

$$C_{in} = \frac{E_{total}}{Q_{oa}} \quad \text{(Equation 1)}$$

where:

C_{in} = indoor formaldehyde concentration (µg/m^3)

E_{total} = total formaldehyde emission rate (µg/h) into the IAQ Zone.

Q_{oa} = design minimum outdoor air ventilation rate to the IAQ Zone (m^3/h)

The above Equation 1 is based upon mass balance theory, and is referenced in Section 3.10.2 "Calculation of Estimated Building Concentrations" of the California Department of Health "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers", (CDPH, 2017).

6.) Calculate the Indoor Exposure Cancer and Non-Cancer Health Risks. For each IAQ Zone, calculate the cancer and non-cancer health risks from the indoor formaldehyde concentrations determined in Step 5 and as described in the OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines; Guidance Manual for Preparation of Health Risk Assessments (OEHHA, 2015).

7.) Mitigate Indoor Formaldehyde Exposures of exceeding the CEQA Cancer and/or Non-Cancer Health Risks. In each IAQ Zone, provide mitigation for any formaldehyde exposure risk as determined in Step 6, that exceeds the CEQA cancer risk of 10 per million or the CEQA non-cancer Hazard Quotient of 1.0.

Provide the source and/or ventilation mitigation required in all IAQ Zones to reduce the health risks of the chemical exposures below the CEQA cancer and non-cancer health risks.

Source mitigation for formaldehyde may include:

1.) reducing the amount materials and/or furnishings that emit formaldehyde
2.) substituting a different material with a lower area-specific emission rate of formaldehyde

Ventilation mitigation for formaldehyde emitted from building materials and/or furnishings may include:

1.) increasing the design minimum outdoor air ventilation rate to the IAQ Zone.

NOTE: Mitigating the formaldehyde emissions through use of less material/furnishings, or use of lower emitting materials/furnishings, is the preferred mitigation option, as mitigation with increased outdoor air ventilation increases initial and operating costs associated with the heating/cooling systems.

Further, we are not asking that the builder to "speculate" on what and how much composite materials be used, but rather at the design stage to select composite wood materials based on the formaldehyde emission rates that manufacturers routinely conduct using the California Department of Health "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers", (CDPH, 2017), and use the procedure described earlier (i.e. Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to insure that the materials selected achieve acceptable cancer risks from material off gassing of formaldehyde.

Outdoor Air Ventilation Impact. Another important finding of the CNHS, was that the outdoor air ventilation rates in the homes were very low. Outdoor air ventilation is a very important factor influencing the indoor concentrations of air contaminants, as it is the primary removal mechanism of all indoor air generated contaminants. Lower outdoor air exchange rates cause indoor generated air contaminants to accumulate to higher indoor air concentrations. Many homeowners rarely open their windows or doors for ventilation as a result of their concerns for security/safety, noise, dust, and odor concerns (Price, 2007). In the CNHS field study, 32% of the homes did not use their windows during the 24-hour Test Day, and 15% of the homes did not use their windows during the entire preceding week. Most of the homes with no window usage were homes in the winter field session. Thus, a substantial percentage of homeowners never open their windows, especially in the winter season. The median 24-hour measurement was 0.26 air changes per hour (ach), with a range of 0.09 ach to 5.3 ach. A total of 67% of the homes had outdoor air exchange rates below the minimum California Building Code (2001) requirement of 0.35 ach. Thus, the relatively tight envelope construction, combined with the fact that many people never open their windows for ventilation, results in homes with low outdoor air exchange rates and higher indoor air contaminant concentrations.

The Toll Brothers Property Project, Folsom, CA is close to roads with moderate to high traffic (e.g., White Rock Road, Scott Road, Oak Avenue Parkway, Gateway Drive, Mangini Parkway, etc.). Thus, the Project is located in an urban area with ambient noise levels impacted by motor vehicle traffic.

According to the Conformity Analysis for the Toll Brothers Property, Alder Creek Subdivision, City of Folsom, CA (ECORP Consulting, 2026), there has been just four short-term 15 minute measurements of the ambient noise level conducted between 13:02 and 13:13 on Tuesday, February 25, 2025, and modeled ambient traffic noise levels. In Section 13.13.3.4 “Operational Traffic Noise” the modeled ambient noise level was 75.1 dBA CNEL

In order to design the building for this Project such that interior noise levels are acceptable, an acoustic study with actual on-site measurements of the existing ambient noise levels and

modeled future ambient noise levels needs to be conducted. The acoustic study of the existing ambient noise levels should be conducted over a minimum of a one-week period and report the dBA CNEL or Ldn. This study will allow for the selection of a building envelope and windows with a sufficient STC such that the indoor noise levels are acceptable. A mechanical supply of outdoor air ventilation to allow for a habitable interior environment with closed windows and doors will also be required. Such a ventilation system would allow windows and doors to be kept closed at the occupant's discretion to control exterior noise within building interiors.

$PM_{2.5}$ Outdoor Concentrations Impact. An additional impact of the nearby motor vehicle traffic associated with this project, are the outdoor concentrations of $PM_{2.5}$. According to the Conformity Analysis for the Toll Brothers Property, Alder Creek Subdivision, City of Folsom, CA (ECORP Consulting, 2026), the Project is located in the Sacramento Metropolitan Air Quality Management District, which is a State and Federal non-attainment area for $PM_{2.5}$.

An air quality analyses should be conducted to determine the concentrations of $PM_{2.5}$ in the outdoor and indoor air that people inhale each day. This air quality analyses needs to consider the cumulative impacts of the project related emissions, existing and projected future emissions from local $PM_{2.5}$ sources (e.g. stationary sources, motor vehicles, and airport traffic) upon the outdoor air concentrations at the Project site. If the outdoor concentrations are determined to exceed the California and National annual average $PM_{2.5}$ exceedence concentration of 12 $\mu g/m^3$, or the National 24-hour average exceedence concentration of 35 $\mu g/m^3$, then the buildings need to have a mechanical supply of outdoor air that has air filtration with sufficient removal efficiency, such that the indoor concentrations of outdoor $PM_{2.5}$ particles is less than the California and National $PM_{2.5}$ annual and 24-hour standards.

It is my experience that based on the projected high traffic noise levels, the annual average concentration of $PM_{2.5}$ will exceed the California and National $PM_{2.5}$ annual and 24-hour standards and warrant installation of high efficiency air filters (i.e. at least MERV 13, or

possibly MERV 14 or 15 depending on the results of the Project ambient $PM_{2.5}$ concentrations) in all mechanically supplied outdoor air ventilation systems.

Indoor Air Quality Impact Mitigation Measures

The following are recommended mitigation measures to minimize the impacts upon indoor quality:

Indoor Formaldehyde Concentrations Mitigation. Use only composite wood materials (e.g. hardwood plywood, medium density fiberboard, particleboard) for all interior finish systems that are made with CARB approved no-added formaldehyde (NAF) resins (CARB, 2009). CARB Phase 2 certified composite wood products, or ultra-low emitting formaldehyde (ULEF) resins, do not insure indoor formaldehyde concentrations that are below the CEQA cancer risk of 10 per million. Only composite wood products manufactured with CARB approved no-added formaldehyde (NAF) resins, such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can insure that the OEHHA cancer risk of 10 per million is met.

Alternatively, conduct the previously described Pre-Construction Building Material/Furnishing Chemical Emissions Assessment, to determine that the combination of formaldehyde emissions from building materials and furnishings do not create indoor formaldehyde concentrations that exceed the CEQA cancer and non-cancer health risks.

It is important to note that we are not asking that the builder to "speculate" on what and how much composite materials be used, but rather at the design stage to select composite wood materials based on the formaldehyde emission rates that manufacturers routinely conduct using the California Department of Health "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers", (CDPH, 2017), and use the procedure described earlier (i.e. Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to insure that the materials selected achieve acceptable cancer risks from material off gassing of formaldehyde.

References

BIFA. 2018. BIFMA Product Safety and Performance Standards and Guidelines. www.bifma.org/page/standardsoverview

California Air Resources Board. 2009. Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products. California Environmental Protection Agency, Sacramento, CA. https://www.arb.ca.gov/regact/2007/compwood07/fro-final.pdf

California Air Resources Board. 2011. Toxic Air Contaminant Identification List. California Environmental Protection Agency, Sacramento, CA. https://www.arb.ca.gov/toxics/id/taclist.htm

California Building Code. 2001. California Code of Regulations, Title 24, Part 2 Volume 1, Appendix Chapter 12, Interior Environment, Division 1, Ventilation, Section 1207: 2001 California Building Code, California Building Standards Commission. Sacramento, CA.

California Building Standards Commission (2014). 2013 California Green Building Standards Code. California Code of Regulations, Title 24, Part 11. California Building Standards Commission, Sacramento, CA http://www.bsc.ca.gov/Home/CALGreen.aspx.

California Energy Commission, PIER Program. CEC-500-2007-033. Final Report, ARB Contract 03-326. Available at: www.arb.ca.gov/research/apr/past/03-326.pdf.

California Energy Commission, 2015. 2016 Building Energy Efficiency Standards for Residential and Nonresidential Buildings, California Code of Regulations, Title 24, Part 6. http://www.energy.ca.gov/2015publications/CEC-400-2015-037/CEC-400-2015-037-CMF.pdf

CDPH. 2017. *Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers, Version 1.1.* California Department of Public Health, Richmond, CA. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx.

ECORP Consulting. 2026. Conformity Analysis for the Toll Brothers Property, Alder Creek Subdivision, City of Folsom, CA.

EPA. 2011. Exposure Factors Handbook: 2011 Edition, Chapter 16 – Activity Factors. Report EPA/600/R-09/052F, September 2011. U.S. Environmental Protection Agency, Washington, D.C.

Hodgson, A. T., D. Beal, J.E.R. McIlvaine. 2002. Sources of formaldehyde, other aldehydes and terpenes in a new manufactured house. Indoor Air 12: 235–242.

OEHHA (Office of Environmental Health Hazard Assessment). 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines; Guidance Manual for Preparation of Health Risk Assessments.

OEHHA (Office of Environmental Health Hazard Assessment). 2017a. Proposition 65 Safe Harbor Levels. No Significant Risk Levels for Carcinogens and Maximum Allowable Dose Levels for Chemicals Causing Reproductive Toxicity. Available at: http://www.oehha.ca.gov/prop65/pdf/safeharbor081513.pdf

OEHHA - Office of Environmental Health Hazard Assessment. 2017b. All OEHHA Acute, 8-hour and Chronic Reference Exposure Levels. Available at: http://oehha.ca.gov/air/allrels.html

Offermann, F. J. 2009. Ventilation and Indoor Air Quality in New Homes. California Air Resources Board and California Energy Commission, PIER Energy-Related Environmental Research Program. Collaborative Report. CEC-500-2009-085. https://www.arb.ca.gov/research/apr/past/04-310.pdf

Offermann, F. J. and A. T. Hodgson. 2011. Emission Rates of Volatile Organic Compounds in New Homes. Proceedings Indoor Air 2011 (12th International Conference on Indoor Air Quality and Climate 2011), June 5-10, 2011, Austin, TX USA.

Sacramento Metropolitan Air Quality Management District (SMAQMD). 2020. CEQA Guidance and Tools. http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/CEQA-Guidance-Tools

Singer, B.C, Chan, W.R, Kim, Y., Offermann, F.J., and Walker I.S. 2020. Indoor Air Quality in California Homes with Code-Required Mechanical Ventilation. Indoor Air, Vol 30, Issue 5, 885-899.

USGBC. 2014. LEED BD+C Homes v4. U.S. Green Building Council, Washington, D.C. http://www.usgbc.org/credits/homes/v4

APPENDIX A

INDOOR FORMALDEHYDE CONCENTRATIONS
AND THE
CARB FORMALDEHYDE ATCM

With respect to formaldehyde emissions from composite wood products, the CARB ATCM regulations of formaldehyde emissions from composite wood products, do not assure healthful indoor air quality. The following is the stated purpose of the CARB ATCM regulation - *The purpose of this airborne toxic control measure is to "reduce formaldehyde emissions from composite wood products, and finished goods that contain composite wood products, that are sold, offered for sale, supplied, used, or manufactured for sale in California".* In other words, the CARB ATCM regulations do not "assure healthful indoor air quality", but rather "reduce formaldehyde emissions from composite wood products".

Just how much protection do the CARB ATCM regulations provide building occupants from the formaldehyde emissions generated by composite wood products ? Definitely some, but certainly the regulations do not "*assure healthful indoor air quality"* when CARB Phase 2 products are utilized. As shown in the Singer 2020 study of new California homes, the median indoor formaldehyde concentration was of 22.4 $\mu g/m^3$ (18.2 ppb), which corresponds to a cancer risk of 112 per million for occupants with continuous exposure, which is more than 11 times the CEQA cancer risk of 10 per million.

Another way of looking at how much protection the CARB ATCM regulations provide building occupants from the formaldehyde emissions generated by composite wood products is to calculate the maximum number of square feet of composite wood product that can be in a residence without exceeding the CEQA cancer risk of 10 per million for occupants with continuous occupancy.

For this calculation I utilized the floor area (2,272 ft^2), the ceiling height (8.5 ft), and the number of bedrooms (4) as defined in Appendix B (New Single-Family Residence Scenario) of the Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers, Version 1.1, 2017, California Department of Public Health,

Richmond, CA. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx.

For the outdoor air ventilation rate I used the 2019 Title 24 code required mechanical ventilation rate (ASHRAE 62.2) of 106 cfm (180 m^3/h) calculated for this model residence. For the composite wood formaldehyde emission rates I used the CARB ATCM Phase 2 rates.

The calculated maximum number of square feet of composite wood product that can be in a residence, without exceeding the CEQA cancer risk of 10 per million for occupants with continuous occupancy are as follows for the different types of regulated composite wood products.

Medium Density Fiberboard (MDF) – 15 ft^2 (0.7% of the floor area), or
Particle Board – 30 ft^2 (1.3% of the floor area), or
Hardwood Plywood – 54 ft^2 (2.4% of the floor area), or
Thin MDF – 46 ft^2 (2.0 % of the floor area).

For offices and hotels the calculated maximum amount of composite wood product (% of floor area) that can be used without exceeding the CEQA cancer risk of 10 per million for occupants, assuming 8 hours/day occupancy, and the California Mechanical Code minimum outdoor air ventilation rates are as follows for the different types of regulated composite wood products.

Medium Density Fiberboard (MDF) – 3.6 % (offices) and 4.6% (hotel rooms), or
Particle Board – 7.2 % (offices) and 9.4% (hotel rooms), or
Hardwood Plywood – 13 % (offices) and 17% (hotel rooms), or
Thin MDF – 11 % (offices) and 14 % (hotel rooms)

Clearly the CARB ATCM does not regulate the formaldehyde emissions from composite wood products such that the potentially large areas of these products, such as for flooring, baseboards, interior doors, window and door trims, and kitchen and bathroom cabinetry, could be used without causing indoor formaldehyde concentrations that result in CEQA

cancer risks that substantially exceed 10 per million for occupants with continuous occupancy.

Even composite wood products manufactured with CARB certified ultra low emitting formaldehyde (ULEF) resins do not insure that the indoor air will have concentrations of formaldehyde the meet the OEHHA cancer risks that substantially exceed 10 per million. The permissible emission rates for ULEF composite wood products are only 11-15% lower than the CARB Phase 2 emission rates. Only use of composite wood products made with no-added formaldehyde resins (NAF), such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can insure that the OEHHA cancer risk of 10 per million is met.

If CARB Phase 2 compliant or ULEF composite wood products are utilized in construction, then the resulting indoor formaldehyde concentrations should be determined in the design phase using the specific amounts of each type of composite wood product, the specific formaldehyde emission rates, and the volume and outdoor air ventilation rates of the indoor spaces, and all feasible mitigation measures employed to reduce this impact (e.g. use less formaldehyde containing composite wood products and/or incorporate mechanical systems capable of higher outdoor air ventilation rates). See the procedure described earlier (i.e. Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to insure that the materials selected achieve acceptable cancer risks from material off gassing of formaldehyde.

Alternatively, and perhaps a simpler approach, is to use only composite wood products (e.g. hardwood plywood, medium density fiberboard, particleboard) for all interior finish systems that are made with CARB approved no-added formaldehyde (NAF) resins.

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Education

M.S. Mechanical Engineering (1985)
Stanford University, Stanford, CA.

Graduate Studies in Air Pollution Monitoring and Control (1980)
University of California, Berkeley, CA.

B.S. in Mechanical Engineering (1976)
Rensselaer Polytechnic Institute, Troy, N.Y.

Professional Experience

President: Indoor Environmental Engineering, San Francisco, CA. December, 1981 - present.

Direct team of environmental scientists, chemists, and mechanical engineers in conducting State and Federal research regarding indoor air quality instrumentation development, building air quality field studies, ventilation and air cleaning performance measurements, and chemical emission rate testing.

Provide design side input to architects regarding selection of building materials and ventilation system components to ensure a high quality indoor environment.

Direct Indoor Air Quality Consulting Team for the winning design proposal for the new State of Washington Ecology Department building.

Develop a full-scale ventilation test facility for measuring the performance of air diffusers; ASHRAE 129, Air Change Effectiveness, and ASHRAE 113, Air Diffusion Performance Index.

Develop a chemical emission rate testing laboratory for measuring the chemical emissions from building materials, furnishings, and equipment, including 3D-printers, fireproofed respirators, candles, self-cleaning ovens, spray polyurethane foam (SPF), laminate flooring, fireproofed building joists.

Principle Investigator of the California New Homes Study (2005-2007). Measured ventilation and indoor air quality in 108 new single family detached homes in northern and southern California.

Develop and teach IAQ professional development workshops to building owners, managers, hygienists, and engineers.

Air Pollution Engineer: Earth Metrics Inc., Burlingame, CA, October, 1985 to March, 1987.

Responsible for development of an air pollution laboratory including installation a forced choice olfactometer, tracer gas electron capture chromatograph, and associated calibration facilities. Field team leader for studies of fugitive odor emissions from sewage treatment plants, entrainment of fume hood exhausts into computer chip fabrication rooms, and indoor air quality investigations.

Staff Scientist: Building Ventilation and Indoor Air Quality Program, Energy and Environment Division, Lawrence Berkeley Laboratory, Berkeley, CA. January, 1980 to August, 1984.

Deputy project leader for the Control Techniques group; responsible for laboratory and field studies aimed at evaluating the performance of indoor air pollutant control strategies (i.e. ventilation, filtration, precipitation, absorption, adsorption, and source control).

Coordinated field and laboratory studies of air-to-air heat exchangers including evaluation of thermal performance, ventilation efficiency, cross-stream contaminant transfer, and the effects of freezing/defrosting.

Developed an *in situ* test protocol for evaluating the performance of air cleaning systems and introduced the concept of effective cleaning rate (ECR) also known as the Clean Air Delivery Rate (CADR).

Coordinated laboratory studies of portable and ducted air cleaning systems and their effect on indoor concentrations of respirable particles and radon progeny.

Co-designed an automated instrument system for measuring residential ventilation rates and radon concentrations.

Designed hardware and software for a multi-channel automated data acquisition system used to evaluate the performance of air-to-air heat transfer equipment.

Assistant Chief Engineer: Alta Bates Hospital, Berkeley, CA, October, 1979 to January, 1980.

Responsible for energy management projects involving installation of power factor correction capacitors on large inductive electrical devices and installation of steam meters on physical plant steam lines. Member of Local 39, International Union of Operating Engineers.

Manufacturing Engineer: American Precision Industries, Buffalo, NY, October, 1977 to October, 1979.

Responsible for reorganizing the manufacturing procedures regarding production of shell and tube heat exchangers. Designed customized automatic assembly, welding, and testing equipment. Designed a large paint spray booth. Prepared economic studies justifying new equipment purchases. Safety Director.

Project Engineer: Arcata Graphics, Buffalo, N.Y. June, 1976 to October, 1977.

Responsible for the design and installation of a bulk ink storage and distribution system and high speed automatic counting and marking equipment. Also coordinated material handling studies which led to the purchase and installation of new equipment.

PROFESSIONAL ORGANIZATION MEMBERSHIP

American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)

- Chairman of SPC-145P, Standards Project Committee - Test Method for Assessing the Performance of Gas Phase Air Cleaning Equipment (1991-1992)
- Member SPC-129P, Standards Project Committee - Test Method for Ventilation Effectiveness (1986-97)
  - Member of Drafting Committee
- Member Environmental Health Committee (1992-1994, 1997-2001, 2007-2010)
  - Chairman of EHC Research Subcommittee
  - Member of Man Made Mineral Fiber Position Paper Subcommittee
  - Member of the IAQ Position Paper Committee
  - Member of the Legionella Position Paper Committee
  - Member of the Limiting Indoor Mold and Dampness in Buildings Position Paper Committee
- Member SSPC-62, Standing Standards Project Committee - Ventilation for Acceptable Indoor Air Quality (1992 to 2000)
  - Chairman of Source Control and Air Cleaning Subcommittee
- Member SSPC-55, Standing Standards Project Committee – Thermal Environmental Conditions for Human Occupancy (2017 to present)
- Chairman of TC-4.10, Indoor Environmental Modeling (1988-92)
  - Member of Research Subcommittee
- Chairman of TC-2.3, Gaseous Air Contaminants and Control Equipment (1989-92)
  - Member of Research Subcommittee
- Member of TG2, Reactive Air and Surface Disinfection (2021-present)

American Society for Testing and Materials (ASTM)

- D-22 Sampling and Analysis of Atmospheres (1992-present)
  - Member of Indoor Air Quality Subcommittee
- E-06 Performance of Building Constructions (1992-present)

American Board of Industrial Hygiene (ABIH)

American Conference of Governmental Industrial Hygienists (ACGIH)

- Bioaerosols Committee (2007-present)
- Bioaerosols Assessment and Control Book Revision Committee Member (2020-2024)

American Industrial Hygiene Association (AIHA)

Cal-OSHA Indoor Air Quality Advisory Committee

International Society of Indoor Air Quality and Climate (ISIAQ)

- Co-Chairman of Task Force on HVAC Hygiene (1999-2002)

U. S. Green Building Council (USGBC)
- Member of the IEQ Technical Advisory Group (2007-2009)
- Member of the IAQ Performance Testing Work Group (2010-2012)

Western Construction Consultants (WESTCON)

PROFESSIONAL CREDENTIALS

Licensed Professional Engineer - Mechanical Engineering

Certified Industrial Hygienist - American Board of Industrial Hygienists

OTHER CERTIFICATIONS

Bronze Cross – Royal Life Saving Society of Canada

SCIENTIFIC MEETINGS AND SYMPOSIA

Biological Contamination, Diagnosis, and Mitigation, Indoor Air'90, Toronto, Canada, August, 1990.

Models for Predicting Air Quality, Indoor Air'90, Toronto, Canada, August, 1990.

Microbes in Building Materials and Systems, Indoor Air '93, Helsinki, Finland, July, 1993.

Microorganisms in Indoor Air Assessment and Evaluation of Health Effects and Probable Causes, Walnut Creek, CA, February 27, 1997.

Controlling Microbial Moisture Problems in Buildings, Walnut Creek, CA, February 27, 1997.

Scientific Advisory Committee, Roomvent 98, 6th International Conference on Air Distribution in Rooms, KTH, Stockholm, Sweden, June 14-17, 1998.

Moisture and Mould, Indoor Air ’99, Edinburgh, Scotland, August, 1999.

Ventilation Modeling and Simulation, Indoor Air ’99, Edinburgh, Scotland, August, 1999.

Microbial Growth in Materials, Healthy Buildings 2000, Espoo, Finland, August, 2000.

Co-Chair, Bioaerosols X- Exposures in Residences, Indoor Air 2002, Monterey, CA, July 2002.

Chair, Environmental Tobacco Smoke in Multi-Family Homes, Indoor Air 2008, Copenhagen, Denmark, July 2008.

Co-Chair, ISIAQ Task Force Workshop; HVAC Hygiene, Indoor Air 2002, Monterey, CA, July 2002.

Chair, ETS in Multi-Family Housing: Exposures, Controls, and Legalities Forum, Healthy Buildings 2009, Syracuse, CA, September 14, 2009.

Chair, Energy Conservation and IAQ in Residences Workshop, Indoor Air 2011, Austin, TX, June 6, 2011.

Chair, Electronic Cigarettes: Chemical Emissions and Exposures Colloquium, Indoor Air 2016, Ghent, Belgium, July 4, 2016.

Co-Chair, Thermal Comfort and Perception, Indoor Air 2024, Honolulu, HI, July 2, 2024.

SPECIAL CONSULTATION

Provide consultation to the American Home Appliance Manufacturers on the development of a standard for testing portable air cleaners, AHAM Standard AC-1.

Served as an expert witness and special consultant for the U.S. Federal Trade Commission regarding the performance claims found in advertisements of portable air cleaners and residential furnace filters.

Conducted a forensic investigation for a San Mateo, CA *pro se* defendant, regarding an alleged homicide where the victim was kidnapped in a steamer trunk. Determined the air exchange rate in the steamer trunk and how long the person could survive.

Conducted *in situ* measurement of human exposure to toluene fumes released during nailpolish application for a plaintiffs attorney pursuing a California Proposition 65 product labeling case. June, 1993.

Conducted a forensic *in situ* investigation for the Butte County, CA Sheriff's Department of the emissions of a portable heater used in the bedroom of two twin one year old girls who suffered simultaneous crib death.

Consult with OSHA on the 1995 proposed new regulation regarding indoor air quality and environmental tobacco smoke.

Consult with EPA on the proposed Building Alliance program and with OSHA on the proposed new OSHA IAQ regulation.

Johnson Controls Audit/Certification Expert Review; Milwaukee, WI. May 28-29, 1997.

Winner of the nationally published 1999 Request for Proposals by the State of Washington to conduct a comprehensive indoor air quality investigation of the Washington State Department of Ecology building in Lacey, WA.

Selected by the State of California Attorney General's Office in August, 2000 to conduct a comprehensive indoor air quality investigation of the Tulare County Court House.

Lawrence Berkeley Laboratory IAQ Experts Workshop: "Cause and Prevention of Sick Building Problems in Offices: The Experience of Indoor Environmental Quality Investigators", Berkeley, California, May 26-27, 2004.

Provide consultation and chemical emission rate testing to the State of California Attorney General's Office in 2011regarding formaldehyde emissions from Brazilian Blowout hair straitening product.

Provide hazard assessment to the State of California Attorney General's Office in 2013-2015 regarding the chemical emissions from e-cigarettes.

Consult with the California Department of Public Health Indoor Air Section regarding ventilation and air filtration in schools during the COVID-19 pandemic, 2020-2022.

PEER-REVIEWED PUBLICATIONS :

F.J.Offermann, C.D.Hollowell, and G.D.Roseme, "Low-Infiltration Housing in Rochester, New York: A Study of Air Exchange Rates and Indoor Air Quality," *Environment International*, *8*, pp. 435-445, 1982.

W.W.Nazaroff, F.J.Offermann, and A.W.Robb, "Automated System for Measuring Air Exchange Rate and Radon Concentration in Houses," *Health Physics*, *45*, pp. 525-537, 1983.

F.J.Offermann, W.J.Fisk, D.T.Grimsrud, B.Pedersen, and K.L.Revzan, "Ventilation Efficiencies of Wall- or Window-Mounted Residential Air-to-Air Heat Exchangers," *ASHRAE Annual Transactions*, *89-2B*, pp 507-527, 1983.

W.J.Fisk, K.M.Archer, R.E Chant, D. Hekmat, F.J.Offermann, and B.Pedersen, "Onset of Freezing in Residential Air-to-Air Heat Exchangers," *ASHRAE Annual Transactions*, *91-1B*, 1984.

W.J.Fisk, K.M.Archer, R.E Chant, D. Hekmat, F.J.Offermann, and B.Pedersen, "Performance of Residential Air-to-Air Heat Exchangers During Operation with Freezing and Periodic Defrosts," *ASHRAE Annual Transactions*, *91-1B*, 1984.

R.G.Sextro, F.J.Offermann, W.W.Nazaroff, and A.V.Nero, "Effects of Aerosol Concentrations on Radon Progeny," Aerosols, Science, & Technology, and Industrial Applications of Airborne Particles, editors B.Y.H.Liu, D.Y.H.Pui, and H.J.Fissan, p525, Elsevier, 1984.

K.Sexton, S.Hayward, F.Offermann, R.Sextro, and L.Weber, "Characterization of Particulate and Organic Emissions from Major Indoor Sources, Third International Conference on Indoor Air Quality and Climate, Stockholm, Sweden, August 20-24, 1984.

F.J.Offermann, R.G.Sextro, W.J.Fisk, D.T.Grimsrud, W.W.Nazaroff, A.V.Nero, and K.L.Revzan, "Control of Respirable Particles with Portable Air Cleaners," *Atmospheric Environment*, Vol. 19, pp.1761-1771, 1985.

R.G.Sextro, F.J.Offermann, W.W.Nazaroff, A.V.Nero, K.L.Revzan, and J.Yater, "Evaluation of Indoor Control Devices and Their Effects on Radon Progeny Concentrations," *Atmospheric Environment*, *12*, pp. 429-438, 1986.

W.J. Fisk, R.K.Spencer, F.J.Offermann, R.K.Spencer, B.Pedersen, R.Sextro, "Indoor Air Quality Control Techniques," *Noyes Data Corporation*, Park Ridge, New Jersey, (1987).

F.J.Offermann, "Ventilation Effectiveness and ADPI Measurements of a Forced Air Heating System," *ASHRAE Transactions* , Volume 94, Part 1, pp 694-704, 1988.

F.J.Offermann and D. Int-Hout "Ventilation Effectiveness Measurements of Three Supply/Return Air Configurations," *Environment International* , Volume 15, pp 585-592 1989.

F.J. Offermann, S.A. Loiselle, M.C. Quinlan, and M.S. Rogers, "A Study of Diesel Fume Entrainment in an Office Building," *IAQ '89*, The Human Equation: Health and Comfort, pp 179-183, ASHRAE, Atlanta, GA, 1989.

R.G.Sextro and F.J.Offermann, "Reduction of Residential Indoor Particle and Radon Progeny Concentrations with Ducted Air Cleaning Systems," submitted to *Indoor Air*, 1990.

L.A. Gundel, J.M. Daisey, and F.J. Offermann, "A Sampling and Analytical Method for Gas Phase Polycyclic Aromatic Hydrocarbons", Proceedings of the 5th International Conference on Indoor Air Quality and Climate, Indoor Air '90, July 29-August 1990.

A.T. Hodgson, J.M. Daisey, and F.J. Offermann "Development of an Indoor Sampling and Analytical Method for Particulate Polycyclic Aromatic Hydrocarbons", Proceedings of the 5th International Conference on Indoor Air Quality and Climate, Indoor Air '90, July 29-August, 1990.

S.A.Loiselle, A.T.Hodgson, and F.J.Offermann, "Development of An Indoor Air Sampler for Polycyclic Aromatic Compounds", *Indoor Air* , Vol 2, pp 191-210, 1991.

F.J.Offermann, S.A.Loiselle, A.T.Hodgson, L.A. Gundel, and J.M. Daisey, "A Pilot Study to Measure Indoor Concentrations and Emission Rates of Polycyclic Aromatic Compounds", *Indoor Air* , Vol 4, pp 497-512, 1991.

F.J. Offermann, S. A. Loiselle, R.G. Sextro, "Performance Comparisons of Six Different Air Cleaners Installed in a Residential Forced Air Ventilation System," *IAQ'91*, Healthy Buildings, pp 342-350, ASHRAE, Atlanta, GA (1991).

F.J. Offermann, J. Daisey, A. Hodgson, L. Gundell, and S. Loiselle, "A Pilot Study to Measure Indoor Concentrations and Emission Rates of Polycyclic Aromatic Compounds", *Indoor Air,* Vol 4, pp 497-512 (1991).

F.J. Offermann, S. A. Loiselle, R.G. Sextro, "Performance of Air Cleaners Installed in a Residential Forced Air System," *ASHRAE Journal*, pp 51-57, July, 1992.

F.J. Offermann and S. A. Loiselle, "Performance of an Air-Cleaning System in an Archival Book Storage Facility," *IAQ'92*, ASHRAE, Atlanta, GA, 1992.

S.B. Hayward, K.S. Liu, L.E. Alevantis, K. Shah, S. Loiselle, F.J. Offermann, Y.L. Chang, L. Webber, "Effectiveness of Ventilation and Other Controls in Reducing Exposure to ETS in Office Buildings," Indoor Air '93, Helsinki, Finland, July 4-8, 1993.

F.J. Offermann, S. A. Loiselle, G. Ander, H. Lau, "Indoor Contaminant Emission Rates Before and After a Building Bake-out," *IAQ'93*, Operating and Maintaining Buildings for Health, Comfort, and Productivity, pp 157-163, ASHRAE, Atlanta, GA, 1993.

L.E. Alevantis, Hayward, S.B., Shah, S.B., Loiselle, S., and Offermann, F.J. "Tracer Gas Techniques for Determination of the Effectiveness of Pollutant Removal From Local Sources," *IAQ '93*, Operating and Maintaining Buildings for Health, Comfort, and Productivity, pp 119-129, ASHRAE, Atlanta, GA, 1993.

L.E. Alevantis, Liu, L.E., Hayward, S.B., Offermann, F.J., Shah, S.B., Leiserson, K. Tsao, E., and Huang, Y., "Effectiveness of Ventilation in 23 Designated Smoking Areas in California Buildings," *IAQ '94*, Engineering Indoor Environments, pp 167-181, ASHRAE, Atlanta, GA, 1994.

L.E. Alevantis, Offermann, F.J., Loiselle, S., and Macher, J.M., "Pressure and Ventilation Requirements of Hospital Isolation Rooms for Tuberculosis (TB) Patients: Existing

Guidelines in the United States and a Method for Measuring Room Leakage", Ventilation and Indoor Air Quality in Hospitals, M. Maroni, editor, Kluwer Academic publishers, Netherlands, 1996.

F.J. Offermann, M. A. Waz, A.T. Hodgson, and H.M. Ammann, "Chemical Emissions from a Hospital Operating Room Air Filter," *IAQ'96*, Paths to Better Building Environments, pp 95-99, ASHRAE, Atlanta, GA, 1996.

F.J. Offermann, "Professional Malpractice and the Sick Building Investigator," *IAQ'96*, Paths to Better Building Environments, pp 132-136, ASHRAE, Atlanta, GA, 1996.

F.J. Offermann, "Standard Method of Measuring Air Change Effectiveness," *Indoor Air,* Vol 1, pp.206-211, 1999.

F. J. Offermann, A. T. Hodgson, and J. P. Robertson, "Contaminant Emission Rates from PVC Backed Carpet Tiles on Damp Concrete", Healthy Buildings 2000, Espoo, Finland, August 2000.

K.S. Liu, L.E. Alevantis, and F.J. Offermann, "A Survey of Environmental Tobacco Smoke Controls in California Office Buildings", *Indoor Air*, Vol 11, pp. 26-34, 2001.

F.J. Offermann, R. Colfer, P. Radzinski, and J. Robertson, "Exposure to Environmental Tobacco Smoke in an Automobile", Indoor Air 2002, Monterey, California, July 2002.

F. J. Offermann, J.P. Robertson, and T. Webster, "The Impact of Tracer Gas Mixing on Airflow Rate Measurements in Large Commercial Fan Systems", Indoor Air 2002, Monterey, California, July 2002.

M. J. Mendell, T. Brennan, L. Hathon, J.D. Odom, F.J.Offermann, B.H. Turk, K.M. Wallingford, R.C. Diamond, W.J. Fisk, "Causes and prevention of Symptom Complaints in Office Buildings: Distilling the Experience of Indoor Environmental Investigators", Indoor Air 2005, Beijing, China, September 4-9, 2005.

F.J. Offermann, "Ventilation and IAQ in New Homes With and Without Mechanical Outdoor Air Systems", Healthy Buildings 2009, Syracuse, CA, September 14, 2009.

F.J. Offermann and A.T. Hodgson, "Emission Rates of Volatile Organic Compounds in New Homes", Indoor Air 2011, Austin, TX, June, 2011.

P. Jenkins, R. Johnson, T. Phillips, and F. Offermann, "Chemical Concentrations in New California Homes and Garages", Indoor Air 2011, Austin, TX, June, 2011.

W. J. Mills, B. J. Grigg, F. J. Offermann, B. E. Gustin, and N. E. Spingarm, "Toluene and Methyl Ethyl Ketone Exposure from a Commercially Available Contact Adhesive", Journal of Occupational and Environmental Hygiene, 9:D95-D102 May, 2012.

F. J. Offermann, R. Maddalena, J. C. Offermann, B. C. Singer, and H, Wilhelm, "The

Impact of Ventilation on the Emission Rates of Volatile Organic Compounds in Residences", HB 2012, Brisbane, AU, July, 2012.

F. J. Offermann, A. T. Hodgson, P. L. Jenkins, R. D. Johnson, and T. J. Phillips, "Attached Garages as a Source of Volatile Organic Compounds in New Homes", HB 2012, Brisbane, CA, July, 2012.

R. Maddalena, N. Li, F. Offermann, and B. Singer, "Maximizing Information from Residential Measurements of Volatile Organic Compounds", HB 2012, Brisbane, AU, July, 2012.

W. Chen, A. Persily, A. Hodgson, F. Offermann, D. Poppendieck, and K. Kumagai, "Area-Specific Airflow Rates for Evaluating the Impacts of VOC emissions in U.S. Single-Family Homes", Building and Environment, Vol. 71, 204-211, February, 2014.

F. J. Offermann, A. Eagan A. C. Offermann, and L. J. Radonovich, "Infectious Disease Aerosol Exposures With and Without Surge Control Ventilation System Modifications", Indoor Air 2014, Hong Kong, July, 2014.

F. J. Offermann, A. Eagan A. C. Offermann, S. Subhash, S. Miller, and L. J. Radonovich, "Potential airborne pathogen transmission in a hospital with and without surge control ventilation system modifications. Building and Environment, Volume 106, Pages 175-180.

F. J. Offermann, "Chemical Emissions from E-Cigarettes: Direct and Indirect Passive Exposures", Building and Environment, Vol. 93, Part 1, 101-105, November, 2015.

F. J. Offermann, "Formaldehyde Emission Rates From Lumber Liquidators Laminate Flooring Manufactured in China", Indoor Air 2016, Belgium, Ghent, July, 2016.

F. J. Offermann, "Formaldehyde and Acetaldehyde Emission Rates for E-Cigarettes", Indoor Air 2016, Belgium, Ghent, July, 2016.

F. J. Offermann, "Formaldehyde Emission Rates From Laminate Flooring", ASHRAE Journal, Atlanta, GA, March, 2017.

F. J. Offermann and A.T. Hodgson, "Accuracy of Three Types of Formaldehyde Passive Samplers", Indoor Air 2018, Philadelphia, PA, July, 2018.

F. J. Offermann and M. Nicas, "Use With Adequate Ventilation ?", ASHRAE Journal, Atlanta, GA, May, 2018.

B. C. Singer, W.R. Chan, Y-S Kim, F.J. Offermann, I.A. Walker, "Indoor Air Quality in California Homes with Code-Required Mechanical Ventilation". Indoor Air, 2020.

F J. Offermann. "Chemical Emissions from Spray Polyurethane Foam (SPF) Insulation in Residences", Indoor Air 2022, Kuopio, Finland, June, 2022.

F.J. Offermann, “Mitigation of Spray Polyurethane Foam with High Chemical Emission Rates”, Indoor Air 2024, Honolulu, HI, July, 2024.

OTHER REPORTS:

W.J.Fisk, P.G.Cleary, and F.J.Offermann, "Energy Saving Ventilation with Residential Heat Exchangers," a Lawrence Berkeley Laboratory brochure distributed by the Bonneville Power Administration, 1981.

F.J.Offermann, J.R.Girman, and C.D.Hollowell, "Midway House Tightening Project: A Study of Indoor Air Quality," Lawrence Berkeley Laboratory, Berkeley, CA, Report LBL-12777, 1981.

F.J.Offermann, J.B.Dickinson, W.J.Fisk, D.T.Grimsrud, C.D.Hollowell, D.L.Krinkle, and G.D.Roseme, "Residential Air-Leakage and Indoor Air Quality in Rochester, New York," Lawrence Berkeley Laboratory, Berkeley, CA, Report LBL-13100, 1982.

F.J.Offermann, W.J.Fisk, B.Pedersen, and K.L.Revzan, Residential Air-to-Air Heat Exchangers: A Study of the Ventilation Efficiencies of Wall- or Window- Mounted Units," Lawrence Berkeley Laboratory, Berkeley, CA, Report LBL-14358, 1982.

F.J.Offermann, W.J.Fisk, W.W.Nazaroff, and R.G.Sextro, "A Review of Portable Air Cleaners for Controlling Indoor Concentrations of Particulates and Radon Progeny," An interim report for the Bonneville Power Administration, 1983.

W.J.Fisk, K.M.Archer, R.E.Chant, D.Hekmat, F.J.Offermann, and B.S. Pedersen, "Freezing in Residential Air-to-Air Heat Exchangers: An Experimental Study," Lawrence Berkeley Laboratory, Berkeley, CA, Report LBL-16783, 1983.

R.G.Sextro, W.W.Nazaroff, F.J.Offermann, and K.L.Revzan, "Measurements of Indoor Aerosol Properties and Their Effect on Radon Progeny," Proceedings of the American Association of Aerosol Research Annual Meeting, April, 1983.

F.J.Offermann, R.G.Sextro, W.J.Fisk, W.W. Nazaroff, A.V.Nero, K.L.Revzan, and J.Yater, "Control of Respirable Particles and Radon Progeny with Portable Air Cleaners," Lawrence Berkeley Laboratory, Berkeley, CA, Report LBL-16659, 1984.

W.J.Fisk, R.K.Spencer, D.T.Grimsrud, F.J.Offermann, B.Pedersen, and R.G.Sextro, "Indoor Air Quality Control Techniques: A Critical Review," Lawrence Berkeley Laboratory, Berkeley, CA, Report LBL-16493, 1984.

R.Otto, J.Girman, F.Offermann, and R.Sextro, "A New Method for the Collection and Comparison of Respirable Particles in the Indoor Environment," Lawrence Berkeley Laboratory, Berkeley, CA, Special Director Fund's Study, 1984.

A.T.Hodgson and F.J.Offermann, "Examination of a Sick Office Building," Lawrence Berkeley Laboratory, Berkeley, CA, an informal field study, 1984.

F.J.Offermann, "Tracer Gas Measurements of Laboratory Fume Entrainment at a Semi-Conductor Manufacturing Plant," an Indoor Environmental Engineering R&D Report, 1986.

F.J.Offermann, "Tracer Gas Measurements of Ventilation Rates in a Large Office Building," an Indoor Environmental Engineering R&D Report, 1986.

F.J.Offermann, "Measurements of Volatile Organic Compounds in a New Large Office Building with Adhesive Fastened Carpeting," an Indoor Environmental Engineering R&D Report, 1986.

F.J.Offermann, "Designing and Operating Healthy Buildings", an Indoor Environmental Engineering R&D Report, 1986.

F.J.Offermann, "Measurements and Mitigation of Indoor Spray-Applicated Pesticides", an Indoor Environmental Engineering R&D Report, 1988.

F.J.Offermann and S. Loiselle, "Measurements and Mitigation of Indoor Mold Contamination in a Residence", an Indoor Environmental Engineering R&D Report, 1989.

F.J.Offermann and S. Loiselle, "Performance Measurements of an Air Cleaning System in a Large Archival Library Storage Facility", an Indoor Environmental Engineering R&D Report, 1989.

F.J. Offermann, J.M. Daisey, L.A. Gundel, and A.T. Hodgson, S. A. Loiselle, "Sampling, Analysis, and Data Validation of Indoor Concentrations of Polycyclic Aromatic Hydrocarbons", Final Report, Contract No. A732-106, California Air Resources Board, March, 1990.

F.J. Offermann, J.O. Sateri, “Tracer Gas Measurements in Large Multi-Room Buildings”, Indoor Air ’93, Helsinki, Finland, July 4-8, 1993.

F.J.Offermann, M. T. O’Flaherty, and M. A. Waz “Validation of ASHRAE 129 - Standard Method of Measuring Air Change Effectiveness”, Final Report of ASHRAE Research Project 891, December 8, 1997.

S.E. Guffey, F.J. Offermann et. al., “Proceedings of the Workshop on Ventilation Engineering Controls for Environmental Tobacco smoke in the Hospitality Industry”, U.S. Department of Labor Occupational Safety and Health Administration and ACGIH, 1998.

F.J. Offermann, R.J. Fiskum, D. Kosar, and D. Mudaari, “A Practical Guide to Ventilation Practices & Systems for Existing Buildings”, *Heating/Piping/Air Conditioning Engineering* supplement to April/May 1999 issue.

F.J. Offermann, P. Pasanen, “Workshop 18: Criteria for Cleaning of Air Handling Systems”, Healthy Buildings 2000, Espoo, Finland, August 2000.

F.J. Offermann, Session Summaries: Building Investigations, and Design & Construction, Healthy Buildings 2000, Espoo, Finland, August 2000.

F.J. Offermann, "Cleaning Up Fire Smoke and Soot Residues Fact Sheet", October, 2007.

F.J. Offermann, "The IAQ Top 10", Engineered Systems, November, 2008.

L. Kincaid and F.J. Offermann, "Unintended Consequences: Formaldehyde Exposures in Green Homes, AIHA Synergist, February, 2010.

F.J. Offermann, " IAQ in Air Tight Homes", ASHRAE Journal, November, 2010.

F.J. Offermann, "The Hazards of E-Cigarettes", ASHRAE Journal, June, 2014.

F.J. Offermann, A.T. Hodgson, and R. Tannous, Commissioning Indoor Air in Office Buildings, August 5, 2017.

F.J. Offermann, Building Protection Factor Fact Sheet, November, 2017.

F.J. Offermann, "Chemical Emissions From Polyurethane Spray Foam", Indoor Environmental Engineering R&D Report, 2020.

F.J. Offermann, "Building Protection Factors", Indoor Environmental Engineering R&D Report, 2020.

F.J. Offermann in collaboration with California Department of Public Health, Indoor Air Quality Section "The Role of Building Ventilation and Filtration in Reducing Risk of Airborne Viral Transmission in Schools, Illustrated with SARS-COV-2". September 1, 2020.

F.J. Offermann, "Beware The COVID-19 Snake Oil Salesmen Are Here". November 5, 2020.

F.J. Offermann in collaboration with California Department of Public Health, Indoor Air Quality Section, "Ventilation and Filtration to Reduce Long-Range Airborne Transmission of COVID-19 and Other Respiratory Infections: Considerations for Reopened Schools", July, 2021.

F.J. Offermann in collaboration with California Department of Public Health, Indoor Air Quality Section, "Information for School Districts on Purchase of Filtration and Air Cleaning Devices", August 2021.

PRESENTATIONS :

"Low-Infiltration Housing in Rochester, New York: A Study of Air Exchange Rates and Indoor Air Quality," Presented at the International Symposium on Indoor Air Pollution, Health and Energy Conservation, Amherst, MA, October 13-16,1981.

"Ventilation Efficiencies of Wall- or Window-Mounted Residential Air-to-Air Heat Exchangers," Presented at the American Society of Heating, Refrigeration, and Air Conditioning Engineers Summer Meeting, Washington, DC, June, 1983.

"Controlling Indoor Air Pollution from Tobacco Smoke: Models and Measurements," Presented at the Third International Conference on Indoor Air Quality and Climate, Stockholm, Sweden, August 20-24, 1984.

"Indoor Air Pollution: An Emerging Environmental Problem", Presented to the Association of Environmental Professionals, Bar Area/Coastal Region 1, Berkeley, CA, May 29, 1986.

"Ventilation Measurement Techniques," Presented at the Workshop on Sampling and Analytical Techniques, Georgia Institute of Technology, Atlanta, Georgia, September 26, 1986 and September 25, 1987.

"Buildings That Make You Sick: Indoor Air Pollution", Presented to the Sacramento Association of Professional Energy Managers, Sacramento, CA, November 18, 1986.

"Ventilation Effectiveness and Indoor Air Quality", Presented to the American Society of Heating, Refrigeration, and Air Conditioning Engineers Northern Nevada Chapter, Reno, NV, February 18, 1987, Golden Gate Chapter, San Francisco, CA, October 1, 1987, and the San Jose Chapter, San Jose, CA, June 9, 1987.

"Tracer Gas Techniques for Studying Ventilation," Presented at the Indoor Air Quality Symposium, Georgia Tech Research Institute, Atlanta, GA, September 22-24, 1987.

"Indoor Air Quality Control: What Works, What Doesn't," Presented to the Sacramento Association of Professional Energy Managers, Sacramento, CA, November 17, 1987.

"Ventilation Effectiveness and ADPI Measurements of a Forced Air Heating System," Presented at the American Society of Heating, Refrigeration, and Air Conditioning Engineers Winter Meeting, Dallas, Texas, January 31, 1988.

"Indoor Air Quality, Ventilation, and Energy in Commercial Buildings", Presented at the Building Owners &Managers Association of Sacramento, Sacramento, CA, July 21, 1988.

"Controlling Indoor Air Quality: The New ASHRAE Ventilation Standards and How to Evaluate Indoor Air Quality", Presented at a conference "Improving Energy Efficiency and Indoor Air Quality in Commercial Buildings," National Energy Management Institute, Reno, Nevada, November 4, 1988.

"A Study of Diesel Fume Entrainment Into an Office Building," Presented at Indoor Air '89: The Human Equation: Health and Comfort, American Society of Heating, Refrigeration, and Air Conditioning Engineers, San Diego, CA, April 17-20, 1989.

"Indoor Air Quality in Commercial Office Buildings," Presented at the Renewable Energy Technologies Symposium and International Exposition, Santa Clara, CA June 20, 1989.

"Building Ventilation and Indoor Air Quality", Presented to the San Joaquin Chapter of the American Society of Heating, Refrigeration, and Air Conditioning Engineers, September 7, 1989.

"How to Meet New Ventilation Standards: Indoor Air Quality and Energy Efficiency," a workshop presented by the Association of Energy Engineers; Chicago, IL, March 20-21, 1989; Atlanta, GA, May 25-26, 1989; San Francisco, CA, October 19-20, 1989; Orlando, FL, December 11-12, 1989; Houston, TX, January 29-30, 1990; Washington D.C., February 26-27, 1990; Anchorage, Alaska, March 23, 1990; Las Vegas, NV, April 23-24, 1990; Atlantic City, NJ, September 27-28, 1991; Anaheim, CA, November 19-20, 1991; Orlando, FL, February 28 - March 1, 1991; Washington, DC, March 20-21, 1991; Chicago, IL, May 16-17, 1991; Lake Tahoe, NV, August 15-16, 1991; Atlantic City, NJ, November 18-19, 1991; San Jose, CA, March 23-24, 1992.

"Indoor Air Quality," a seminar presented by the Anchorage, Alaska Chapter of the American Society of Heating, Refrigeration, and Air Conditioning Engineers, March 23, 1990.

"Ventilation and Indoor Air Quality", Presented at the 1990 HVAC & Building Systems Congress, Santa, Clara, CA, March 29, 1990.

"Ventilation Standards for Office Buildings", Presented to the South Bay Property Managers Association, Santa Clara, May 9, 1990.

"Indoor Air Quality", Presented at the Responsive Energy Technologies Symposium & International Exposition (RETSIE), Santa Clara, CA, June 20, 1990.

"Indoor Air Quality - Management and Control Strategies", Presented at the Association of Energy Engineers, San Francisco Bay Area Chapter Meeting, Berkeley, CA, September 25, 1990.

"Diagnosing Indoor Air Contaminant and Odor Problems", Presented at the ASHRAE Annual Meeting, New York City, NY, January 23, 1991.

"Diagnosing and Treating the Sick Building Syndrome", Presented at the Energy 2001, Oklahoma, OK, March 19, 1991.

"Diagnosing and Mitigating Indoor Air Quality Problems" a workshop presented by the Association of Energy Engineers, Chicago, IL, October 29-30, 1990; New York, NY, January 24-25, 1991; Anaheim, April 25-26, 1991; Boston, MA, June 10-11, 1991; Atlanta,

GA, October 24-25, 1991; Chicago, IL, October 3-4, 1991; Las Vegas, NV, December 16-17, 1991; Anaheim, CA, January 30-31, 1992; Atlanta, GA, March 5-6, 1992; Washington, DC, May 7-8, 1992; Chicago, IL, August 19-20, 1992; Las Vegas, NV, October 1-2, 1992; New York City, NY, October 26-27, 1992, Las Vegas, NV, March 18-19, 1993; Lake Tahoe, CA, July 14-15, 1994; Las Vegas, NV, April 3-4, 1995; Lake Tahoe, CA, July 11-12, 1996; Miami, FL, December 9-10, 1996.

"Sick Building Syndrome and the Ventilation Engineer", Presented to the San Jose Engineers Club, May 21, 1991.

"Duct Cleaning: Who Needs It ? How Is It Done ? What Are The Costs ?" What Are the Risks ?, Moderator of Forum at the ASHRAE Annual Meeting, Indianapolis ID, June 23, 1991.

"Operating Healthy Buildings", Association of Plant Engineers, Oakland, CA, November 14, 1991.

"Duct Cleaning Perspectives", Moderator of Seminar at the ASHRAE Semi-Annual Meeting, Indianapolis, IN, June 24, 1991.

"Duct Cleaning: The Role of the Environmental Hygienist," ASHRAE Annual Meeting, Anaheim, CA, January 29, 1992.

"Emerging IAQ Issues", Fifth National Conference on Indoor Air Pollution, University of Tulsa, Tulsa, OK, April 13-14, 1992.

"International Symposium on Room Air Convection and Ventilation Effectiveness", Member of Scientific Advisory Board, University of Tokyo, July 22-24, 1992.

"Guidelines for Contaminant Control During Construction and Renovation Projects in Office Buildings," Seminar paper at the ASHRAE Annual Meeting, Chicago, IL, January 26, 1993.

"Outside Air Economizers: IAQ Friend or Foe", Moderator of Forum at the ASHRAE Annual Meeting, Chicago, IL, January 26, 1993.

"Orientation to Indoor Air Quality," an EPA two and one half day comprehensive indoor air quality introductory workshop for public officials and building property managers; Sacramento, September 28-30, 1992; San Francisco, February 23-24, 1993; Los Angeles, March 16-18, 1993; Burbank, June 23, 1993; Hawaii, August 24-25, 1993; Las Vegas, August 30, 1993; San Diego, September 13-14, 1993; Phoenix, October 18-19, 1993; Reno, November 14-16, 1995; Fullerton, December 3-4, 1996; Fresno, May 13-14, 1997.

"Building Air Quality: A Guide for Building Owners and Facility Managers," an EPA one half day indoor air quality introductory workshop for building owners and facility managers. Presented throughout Region IX 1993-1995.

“Techniques for Airborne Disease Control”, EPRI Healthcare Initiative Symposium; San Francisco, CA; June 7, 1994.

“Diagnosing and Mitigating Indoor Air Quality Problems”, CIHC Conference; San Francisco, September 29, 1994.

”Indoor Air Quality: Tools for Schools,” an EPA one day air quality management workshop for school officials, teachers, and maintenance personnel; San Francisco, October 18-20, 1994; Cerritos, December 5, 1996; Fresno, February 26, 1997; San Jose, March 27, 1997; Riverside, March 5, 1997; San Diego, March 6, 1997; Fullerton, November 13, 1997; Santa Rosa, February 1998; Cerritos, February 26, 1998; Santa Rosa, March 2, 1998.

ASHRAE 62 Standard “Ventilation for Acceptable IAQ”, ASCR Convention; San Francisco, CA, March 16, 1995.

“New Developments in Indoor Air Quality: Protocol for Diagnosing IAQ Problems”, AIHA-NC; March 25, 1995.

"Experimental Validation of ASHRAE SPC 129, Standard Method of Measuring Air Change Effectiveness", 16th AIVC Conference, Palm Springs, USA, September 19-22, 1995.

“Diagnostic Protocols for Building IAQ Assessment”, American Society of Safety Engineers Seminar: ‘Indoor Air Quality – The Next Door’; San Jose Chapter, September 27, 1995; Oakland Chapter, 9, 1997.

“Diagnostic Protocols for Building IAQ Assessment”, Local 39; Oakland, CA, October 3, 1995.

“Diagnostic Protocols for Solving IAQ Problems”, CSU-PPD Conference; October 24, 1995.

“Demonstrating Compliance with ASHRAE 62-1989 Ventilation Requirements”, AIHA; October 25, 1995.

“IAQ Diagnostics: Hands on Assessment of Building Ventilation and Pollutant Transport”, EPA Region IX; Phoenix, AZ, March 12, 1996; San Francisco, CA, April 9, 1996; Burbank, CA, April 12, 1996.

“Experimental Validation of ASHRAE 129P: Standard Method of Measuring Air Change Effectiveness”, Room Vent ‘96 / International Symposium on Room Air Convection and Ventilation Effectiveness"; Yokohama, Japan, July 16-19, 1996.

“IAQ Diagnostic Methodologies and RFP Development”, CCEHSA 1996 Annual Conference, Humboldt State University, Arcata, CA, August 2, 1996.

"The Practical Side of Indoor Air Quality Assessments", California Industrial Hygiene Conference '96, San Diego, CA, September 2, 1996.

"ASHRAE Standard 62: Improving Indoor Environments", Pacific Gas and Electric Energy Center, San Francisco, CA, October 29, 1996.

"Operating and Maintaining Healthy Buildings", April 3-4, 1996, San Jose, CA; July 30, 1997, Monterey, CA.

"IAQ Primer", Local 39, April 16, 1997; Amdahl Corporation, June 9, 1997; State Compensation Insurance Fund's Safety & Health Services Department, November 21, 1996.

"Tracer Gas Techniques for Measuring Building Air Flow Rates", ASHRAE, Philadelphia, PA, January 26, 1997.

"How to Diagnose and Mitigate Indoor Air Quality Problems"; Women in Waste; March 19, 1997.

"Environmental Engineer: What Is It?", Monte Vista High School Career Day; April 10, 1997.

"Indoor Environment Controls: What's Hot and What's Not", Shaklee Corporation; San Francisco, CA, July 15, 1997.

"Measurement of Ventilation System Performance Parameters in the US EPA BASE Study", Healthy Buildings/IAQ'97, Washington, DC, September 29, 1997.

"Operations and Maintenance for Healthy and Comfortable Indoor Environments", PASMA; October 7, 1997.

"Designing for Healthy and Comfortable Indoor Environments", Construction Specification Institute, Santa Rosa, CA, November 6, 1997.

"Ventilation System Design for Good IAQ", University of Tulsa 10th Annual Conference, San Francisco, CA, February 25, 1998.

"The Building Shell", Tools For Building Green Conference and Trade Show, Alameda County Waste Management Authority and Recycling Board, Oakland, CA, February 28, 1998.

"Identifying Fungal Contamination Problems In Buildings", The City of Oakland Municipal Employees, Oakland, CA, March 26, 1998.

"Managing Indoor Air Quality in Schools: Staying Out of Trouble", CASBO, Sacramento, CA, April 20, 1998.

"Indoor Air Quality", CSOOC Spring Conference, Visalia, CA, April 30, 1998.

"Particulate and Gas Phase Air Filtration", ACGIH/OSHA, Ft. Mitchell, KY, June 1998.

"Building Air Quality Facts and Myths", The City of Oakland / Alameda County Safety Seminar, Oakland, CA, June 12, 1998.

"Building Engineering and Moisture", Building Contamination Workshop, University of California Berkeley, Continuing Education in Engineering and Environmental Management, San Francisco, CA, October 21-22, 1999.

"Identifying and Mitigating Mold Contamination in Buildings", Western Construction Consultants Association, Oakland, CA, March 15, 2000; AIG Construction Defect Seminar, Walnut Creek, CA, May 2, 2001; City of Oakland Public Works Agency, Oakland, CA, July 24, 2001; Executive Council of Homeowners, Alamo, CA, August 3, 2001.

"Using the EPA BASE Study for IAQ Investigation / Communication", Joint Professional Symposium 2000, American Industrial Hygiene Association, Orange County & Southern California Sections, Long Beach, October 19, 2000.

"Ventilation," Indoor Air Quality: Risk Reduction in the 21st Century Symposium, sponsored by the California Environmental Protection Agency/Air Resources Board, Sacramento, CA, May 3-4, 2000.

"Workshop 18: Criteria for Cleaning of Air Handling Systems", Healthy Buildings 2000, Espoo, Finland, August, 2000.

"Closing Session Summary: 'Building Investigations' and 'Building Design & Construction', Healthy Buildings 2000, Espoo, Finland, August, 2000.

"Managing Building Air Quality and Energy Efficiency, Meeting the Standard of Care", BOMA, MidAtlantic Environmental Hygiene Resource Center, Seattle, WA, May 23rd, 2000; San Antonio, TX, September 26-27, 2000.

"Sensory Stimuli and Ventilation Control". Emerging Issues, ASHRAE IAQ Applications/Summer, 2000.

"Diagnostics & Mitigation in Sick Buildings: When Good Buildings Go Bad," University of California Berkeley, September 18, 2001.

"Mold Contamination: Recognition and What To Do and Not Do", Redwood Empire Remodelers Association; Santa Rosa, CA, April 16, 2002.

"Investigative Tools of the IAQ Trade", Healthy Indoor Environments 2002; Austin, TX; April 22, 2002.

"Finding Hidden Mold: Case Studies in IAQ Investigations", AIHA Northern California Professionals Symposium; Oakland, CA, May 8, 2002.

"Assessing and Mitigating Fungal Contamination in Buildings", Cal/OSHA Training; Oakland, CA, February 14, 2003 and West Covina, CA, February 20-21, 2003.

"Use of External Containments During Fungal Mitigation", Healthy Indoor Environments, Anaheim, CA, April 3, 2003 and ACGIH Mold Remediation Symposium (Invited Speaker), Orlando, FL, November 3-5, 2003.

Building Operator Certification (BOC), 106-IAQ Training Workshops, Northwest Energy Efficiency Council; Stockton, CA, December 3, 2003; San Francisco, CA, December 9, 2003; Irvine, CA, January 13, 2004; San Diego, January 14, 2004; Irwindale, CA, January 27, 2004; Downey, CA, January 28, 2004; Santa Monica, CA, March 16, 2004; Ontario, CA, March 17, 2004; Ontario, CA, November 9, 2004, San Diego, CA, November 10, 2004; San Francisco, CA, November 17, 2004; San Jose, CA, November 18, 2004; Sacramento, CA, March 15, 2005.

"HVAC Systems Maintenance", Cal/OSHA Training, Oakland and West Covina, CA, March 11, 2003.

"Mold Remediation: The National QUEST for Uniformity Symposium", Invited Speaker, Orlando, Florida, November 3-5, 2003.

"Mold and Moisture Control", Indoor Air Quality workshop for The Collaborative for High Performance Schools (CHPS), San Francisco, December 11, 2003.

"Advanced Perspectives In Mold Prevention & Control Symposium", Invited Speaker, Las Vegas, Nevada, November 7-9, 2004.

"Building Sciences: Understanding and Controlling Moisture in Buildings", American Industrial Hygiene Association, San Francisco, CA, February 14-16, 2005.

"Indoor Air Quality Diagnostics and Healthy Building Design", University of California Berkeley, Berkeley, CA, March 2, 2005.

"Managing IAQ in Buildings and the USGBC Certification Program", BOMA Environmental Committee, San Francisco, CA, June 1, 2006.

"Improving IAQ = Reduced Tenant Complaints", Northern California Facilities Exposition, Santa Clara, CA, September 27, 2007.

"Defining Safe Building Air", Criteria for Safe Air and Water in Buildings, ASHRAE Winter Meeting, Chicago, IL, January 27, 2008.

"USGBC LEED and Indoor Air Quality : Leading or Lagging ?", Bay Area LEED Users Group (BAyLUG), San Francisco, CA, June 5, 2008

"Window Usage, Ventilation, and Formaldehyde Concentrations in New California Homes", Indoor Air 2008, Copenhagen, Denmark.

"ETS in Multi-Family Housing: Exposures, Controls, and Legalities", Indoor Air 2008, Copenhagen, Denmark.

"Update on USGBC LEED and Air Filtration", Invited Speaker, NAFA 2008 Convention, San Francisco, CA, September 19, 2008.

"Indoor Air Quality Requirements of Green Buildings", Northern California Facilities Exposition, Santa Clara, CA, September 25, 2008.

"Ventilation and Indoor air Quality in New California Homes", National Center of Healthy Housing, October 20, 2008.

"Indoor Air Quality in New Homes", California Energy and Air Quality Conference, October 29, 2008.

"Mechanical Outdoor air Ventilation Systems and IAQ in New Homes", ACI Home Performance Conference, Kansas City, MO, April 29, 2009.

"Student Performance and Absenteeism Related to IAQ", Balancing IAQ and Energy Conservation/Efficiency Objectives in Schools ASHRAE Summer Meeting, Louisville, KY, June 21, 2009

"Ventilation and IAQ in New Homes with and without Mechanical Outdoor Air Systems", Healthy Buildings 2009, Syracuse, CA, September 14, 2009.

"Ten Ways to Improve Your Air Quality", Northern California Facilities Exposition, Santa Clara, CA, September 30, 2009.

"New Developments in Ventilation and Indoor Air Quality in Residential Buildings", Westcon meeting, Alameda, CA, March 17, 2010.

"Intermittent Residential Mechanical Outdoor Air Ventilation Systems and IAQ", ASHRAE SSPC 62.2 Meeting, Austin, TX, April 19, 2010.

"ASHRAE 62.2 Intermittent Residential Ventilation: What's It Good For, Intermittently Poor IAQ", IAQVEC 2010, Syracuse, CA, April 21, 2010.

"Measured IAQ in Homes", ACI Home Performance Conference, Austin, TX, April 21, 2010.

"Respiration: IEQ and Ventilation", AIHCE 2010, How IH Can LEED in Green Buildings, Denver, CO, May 23, 2010.

"IAQ Considerations for Net Zero Energy Buildings (NZEB)", Northern California Facilities Exposition, Santa Clara, CA, September 22, 2010.

"Energy Conservation and Health in Buildings", Berkeley High School Green Career Week, Berkeley, CA, April 12, 2011.

"What Pollutants are Really There ?", ACI Home Performance Conference, San Francisco, CA, March 30, 2011.

"Energy Conservation and Health in Residences Workshop", Indoor Air 2011, Austin, TX, June 6, 2011.

"Assessing IAQ and Improving Health in Residences", US EPA Weatherization Plus Health, September 7, 2011.

"Ventilation: What a Long Strange Trip It's Been", Westcon, May 21, 2014.

"Chemical Emissions from E-Cigarettes: Direct and Indirect Passive Exposures", Indoor Air 2014, Hong Kong, July, 2014.

"Infectious Disease Aerosol Exposures With and Without Surge Control Ventilation System Modifications", Indoor Air 2014, Hong Kong, July, 2014.

"Chemical Emissions from E-Cigarettes", IMF Health and Welfare Fair, Washington, DC, February 18, 2015.

"Chemical Emissions and Health Hazards Associated with E-Cigarettes", Roswell Park Cancer Institute, Buffalo, NY, August 15, 2014.

"Formaldehyde Indoor Concentrations, Material Emission Rates, and the CARB ATCM", Harris Martin's Lumber Liquidators Flooring Litigation Conference, WQ Minneapolis Hotel, May 27, 2015.

"Chemical Emissions from E-Cigarettes: Direct and Indirect Passive Exposure", FDA Public Workshop: Electronic Cigarettes and the Public Health, Hyattsville, MD June 2, 2015.

"Creating Healthy Homes, Schools, and Workplaces", Chautauqua Institution, Athenaeum Hotel, August 24, 2015.

"Diagnosing IAQ Problems and Designing Healthy Buildings", University of California Berkeley, Berkeley, CA, October 6, 2015.

"Diagnosing Ventilation and IAQ Problems in Commercial Buildings", BEST Center Annual Institute, Lawrence Berkeley National Laboratory, January 6, 2016.

"A Review of Studies of Ventilation and Indoor Air Quality in New Homes and Impacts

of Environmental Factors on Formaldehyde Emission Rates From Composite Wood Products", AIHce2016, May, 21-26, 2016.

"Admissibility of Scientific Testimony", Science in the Court, Proposition 65 Clearinghouse Annual Conference, Oakland, CA, September 15, 2016.

"Indoor Air Quality and Ventilation", ASHRAE Redwood Empire, Napa, CA, December 1, 2016.

"Energy Conservation and Health in Buildings", Berkeley High School Green Career Week, Berkeley, CA, March 8, 2017.

"What Does 'Use With Adequate Ventilation' Mean ?", Indoor Air 2018, Philadelphia, PA, July, 2018.

"Ventilation, Air Filtration, and COVID-19, Avoiding the Snake Oil Salesman", IAQ Radio, January 29, 2021.

"How to Prevent Snake Oil Sales from the IAQ Industry". Healthy Indoors Live Show, April 15, 2021.

"Ventilation, Air Filtration, and COVID-19: Avoiding the Snake Oil Salesman" OCFMA Presentation, June 3, 2021.

"Ventilation, Air Filtration, and COVID-19, Avoiding the Snake Oil Salesman", Ontario College Facilities Management Association, June 23, 2021.

"Air Quality Expert Warns of COVID-19 Snake Oil Salesmen". NBC Bay Area, August 4, 2021.

"Managing Wildfire Smoke Indoors During COVID 19", ASHRAE Golden Gate Chapter, San Francisco, CA, February 17, 2022.

"Chemical Emissions from Spray Polyurethane Foam (SPF) Insulation in Residences, Indoor Air 2022, Kuopio, Finland, June, 2022.

"How good is your ventilation? Indoor Air Quality and the passenger experience within Airports". 2022 Greenbuild International Conference & Expo, November 1-3, 2022.

"Assessing and Mitigating Fungal Contamination in Buildings". Cal/OSHA Training. Oakland, CA (February 14, 2003) West Covina, CA (February 20 and 21, 2003).

"Mold Contamination in Buildings", Tenant Law Group – Lunch and Learn, April, 19, 2023.

"Ventilation / Filtration and Tenants" Regional Asthma Management and Prevention, June 29, 2023 Webinar.

EXHIBIT D

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Indoor Air Quality in California Homes with Code-Required Mechanical Ventilation

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Abstract

Data were collected in 70 detached houses built in 2011-2017 in compliance with the mechanical ventilation requirements of California's building energy efficiency standards. Each home was monitored for a one-week period with windows closed and the central mechanical ventilation system operating. Pollutant measurements included time-resolved fine particulate matter ($PM_{2.5}$) indoors and outdoors and formaldehyde and carbon dioxide (CO_2) indoors. Time-integrated measurements were made for formaldehyde, NO_2 and nitrogen oxides (NO_X) indoors and outdoors. Operation of the cooktop, range hood and other exhaust fans was continuously recorded during the monitoring period. One-time diagnostic measurements included mechanical airflows and envelope and duct system air leakage. All homes met or were very close to meeting the ventilation requirements. On average the dwelling unit ventilation fan moved 50% more airflow than the minimum requirement. Pollutant concentrations were similar or lower than those reported in a 2006-2007 study of California new homes built in 2002-2005. Mean and median indoor concentrations were lower by 44% and 38% for formaldehyde and 44% and 54% for $PM_{2.5}$. Ventilation fans were operating in only 26% of homes when first visited and the control switches in many homes did not have informative labels as required by building standards.

Keywords: ASHRAE 62.2, Healthy Efficient New Gas Home Study, Carbon dioxide, Fine particulate matter, Formaldehyde, Nitrogen dioxide

Practical Implications

High performance home standards and building codes and regulations require mechanical ventilation equipment to help manage moisture and air pollutants emitted indoors. This paper demonstrates the success of a new construction residential ventilation requirement instituted in the state of California in 2008, with almost all studied homes having compliant ventilation equipment. The study found that the combination of mechanical ventilation and implementation of a standard that reduced the allowable formaldehyde emissions from manufactured wood products resulted in formaldehyde concentrations that were lower by 44% and 38% at mean and

median levels than in homes built prior to the standards. This study affirms that new homes can be built to stringent efficiency standards while maintaining indoor air quality.

1. Introduction

Since 2008, California's statewide residential building code has included requirements for mechanical ventilation to protect indoor air quality (IAQ). Ventilation requirements were implemented to mitigate any negative impacts of reducing uncontrolled air infiltration by envelope air-sealing to reduce energy use. Lower air infiltration reduces dilution of pollutants emitted inside the home, leading to higher concentrations if no other actions are taken. Although mechanical ventilation in new homes has become commonplace in many developed countries, it is uncommon in the U.S., particularly in single-family dwellings. Many state and local building codes in the U.S. have implicitly relied on natural ventilation through leaky envelopes or for occupants to manage IAQ using natural ventilation.

The presumption that occupants effectively utilize natural ventilation to manage moisture and chronic exposure to formaldehyde and other pollutants from indoor sources in homes was examined in two large studies conducted in California in the mid-2000s. In 2003, a mail-based survey was sent to a statewide representative sample of homes built in 2002-2003 to query IAQ satisfaction, ventilation practices, activities, and equipment use that can impact IAQ[1]. Based on self-reported window use, the researchers assessed that most homes were substantially under-ventilated relative to the target of 0.35 h^{-1}, from the ASHRAE 62-1999 ventilation standard.

The California New Home Study (CNHS), conducted in 2006-2007, collected data in 108 homes built in 2002–2005[2]. The study included a thorough characterization of the building and thermal and mechanical equipment; measurements of envelope and garage-to-house air leakage; an occupant questionnaire that covered many of the same topics as the earlier mailed survey; monitoring of window use over a week; and measurements of air exchange and various IAQ parameters over a single 24-hour period. Sampling was roughly split between winter and summer

and between Northern and Southern California. Monitoring was repeated in 4 homes to investigate day-to-day and seasonal variability. The study found that actual window use differed from what participants reported generally for the season in which measurements were made (i.e., 52% under-reported and 8.3% over-reported), indicating that self-reported window use in the mailout survey may have been biased low. The field study also found that air exchange rates (AERs) in the majority of new homes were below the target of 0.35 h^{-1} and that formaldehyde was substantially above state exposure guidelines in almost all homes. The results of these two studies suggested that new homes were not being adequately ventilated and that relying on occupants and natural ventilation is not an acceptable approach.

Starting with the 2008 statewide Title 24 Building Standards, California instituted mechanical ventilation requirements that were a hybrid of the requirements in the 2007 and 2010 versions of the ASHRAE Standard 62.2 for residential ventilation[3]. The California standard required exhaust fans in the kitchen and every bathroom and general ventilation for the dwelling unit that could be satisfied with a continuous or intermittent system, utilizing exhaust, supply or balanced airflows. A severe slowdown in new home starts in 2008-2010 delayed implementation as most homes built during these years had been approved under the prior building code. The ventilation requirements were not fully incorporated until at least 2010.

The Healthy Efficient New Gas Home (HENGH) study, described herein, was performed to evaluate IAQ in California homes built to meet the 2008 building standards for ventilation. The study focused on homes with natural gas because the sponsoring research program is financed by a surcharge on investor-owned, gas utility customers and because gas cooking burners are an important source of air pollutants[4, 5]. The study included a web-based survey of homes built since 2002, a simulation-based study of the energy impacts of ventilation, and the field study described in this paper. A report summarizing results of all three component studies is available[6].

This paper presents the methods and results of the HENGH field study and compares findings from homes built with mechanical ventilation in 2011-2017 to the CNHS homes built in 2002-

2005 mostly without mechanical ventilation. Homes studied in HENGH also were built with materials that complied with an air toxic control measure (ATCM) for composite wood products[7] that was implemented to reduce formaldehyde emissions.

The study goal was to provide empirical evidence of the impacts of ventilation and emission standards in the most populous U.S. state. Findings may inform other states and nations considering standards for residential mechanical ventilation.

2. Methods

2.1. Field Study Overview

Overview of Data Collection in Homes. The study was designed to assess how homes were meeting the mechanical ventilation requirements and how the installed ventilation equipment impacts indoor air quality. The study sought to characterize performance of installed equipment; quantify the use of mechanical ventilation, gas cooking appliances and equipment that can impact IAQ; measure key IAQ parameters over a weeklong monitoring period; and obtain data from building occupants on IAQ and comfort satisfaction and IAQ-relevant activities. A core goal was to evaluate IAQ in homes employing general (dwelling unit) mechanical ventilation but not natural ventilation because the previous studies showed that many California homes do not routinely open windows or doors for natural ventilation during one or more seasons of the year.

The study protocol was approved by the LBNL institutional review board. Methods are summarized in ensuing subsections and detailed protocols are available [8].

Each study home was visited three times. On the first visit, the field team obtained written consent, confirmed that code-required ventilation equipment was present and operable, and started to record house, appliance, and mechanical equipment characteristics. A utility service technician conducted a safety inspection of the gas appliances. In a few homes, the inspection identified a minor issue that the technician resolved on the spot or during a follow-up visit, and field measurements proceeded. During the second visit, the team completed equipment and

house characterization, conducted ventilation diagnostics, installed air quality measurement equipment indoors and outdoors, and installed devices to track ventilation and gas cooking appliance use. The participant was provided with an activity log for each day of the study and asked to partake in normal household activities with the exception that windows and doors should not be used for routine ventilation. Most homes were monitored for seven days, five were sampled for 8 days and one for 6 days. On the third visit, all IAQ and mechanical equipment monitoring devices were removed, the survey and activity logs were collected and a $350 gift card to a home improvement store was provided to the participant.

Eligibility and Recruitment. The study was limited to owner-occupied, detached California houses, built 2011 or later, with gas appliances, mechanical ventilation, and no smoking allowed. Homes had to be customers of SoCalGas or PG&E. Homes with unusual filtration or ventilation systems were excluded. Code compliance records obtained for 23 homes verified they were certified to meet 2008 or more recent standards. The presence of compliant or close to compliant mechanical ventilation equipment was verified in all homes ultimately included in the study.

Most participants were recruited through postcards (see SI) mailed to addresses identified on a real estate website (Zillow.com), targeting single-family, detached homes built 2011 or later. Some participants learned of the study via referrals. Details about the number of respondents, early withdraws and non-qualifying homes is provided in the SI.

2.2. Field Data Collection Procedures

House and Equipment Characterization. The information collected about each home and its mechanical equipment is summarized in the SI.

Air Leakage. Air leakage of the building envelope and the forced air heating/cooling system were measured with the DeltaQ test (ASTM-E1554-2013, Method A) using a TEC Minneapolis Blower Door System with DG-700 digital manometer (energyconservatory.com). The test quantifies air leakage of the forced air system to outside of the living space under normal

operating conditions. Testing was conducted with software that automatically operated the blower door fan through pressurization and depressurization, recorded airflow and pressure differences, calculated envelope and duct leakage, and assessed if the measured parameters were stable enough to provide both parameters. Air leakage was converted to air changes per hour at 50 Pa indoor-outdoor pressure difference (ACH50) using the estimated home volume.

Ventilation Airflows. Airflows of bath and laundry exhaust fans were measured using a TEC Exhaust Fan Flow Meter (energyconservatory.com). Range hood airflows were measured using a balanced-pressure flow hood method described by Walker and Wray[9]. A TEC Minneapolis Duct Blaster, which is a calibrated, pressure-controlled, variable-speed fan, was connected to either the exhaust inlet (preferred) or outlet. If connected at the inlet, a transition piece was adapted onsite to cover the entire underside of the range hood or over-the-range microwave exhaust fan (OTR). The flow through the Duct Blaster was adjusted to achieve neutral pressure between the surrounding environment and the range hood inlet (or outlet) and airflow was determined from the pre-calibrated fan speed versus airflow relationship. The measurement was repeated for the lowest and highest settings and at least one medium setting if available. OTRs were tested in a modified configuration: the top air inlet was covered with tape and the rate of air flowing into the OTR was measured only at the bottom inlet. Subsequent testing at LBNL revealed that this approach produces a biased measurement of total airflow occurring under the normal operating configuration. Correction factors for most of the OTRs seen in the field were determined by comparing the airflow into the bottom inlet when the top was taped to the total flow measured at the exhaust duct outlet in laboratory experiments. The correction factors were applied to the field measured airflows at each OTR setting.

Supply fan flow rates were not measured because the air inlets – usually on roofs or at the eave level – could not be quickly and safely accessed by the field teams. It was also not feasible to measure flows using in-duct velocity probes because the supply ducts were encased in spray foam insulation in the attics. Supply airflows were inferred for two devices based on ratings.

Equipment Usage Monitoring. Operation of exhaust fans, range hoods, and clothes dryers were determined using one of the following: motor on/off sensor (Onset HOBO UX90-004), vane anemometer (Digisense WD-20250-22), or plug load logger (Onset HOBO UX120-018). The field team chose an appropriate sensor for each fan configuration. Range hoods or OTRs were monitored with anemometers and the velocity at each setting was determined at installation to enable tracking of airflows for AER calculations. State sensors (Onset HOBO UX90-001) were used to monitor the most often used exterior doors. Although participants were asked to keep doors and windows closed during monitoring, it was deemed valuable to check for any extended natural ventilation that could affect pollutant measurements and patio doors were assessed as most likely to be left open. Cooktop and oven use were monitored using Maxim iButton DS1922T temperature sensors. Burner use was inferred from analysis of the temperature signals.

Air Quality Measurements. Air quality parameters were measured outdoors on the premises and at several locations indoors, as summarized in Table 1. The central indoor site was generally in a large open room on the first floor that included the kitchen and/or living room, but monitors were not placed directly in the kitchen. Performance specifications of air quality measurement devices are provided in Table 1 with additional information in Table S1 of the SI. Table S2 provides a summary comparison of the methods used to collect air quality data in HENGH and the CNHS. At the HENGH central indoor site, equipment was mounted on a stacked crate system that allowed free airflow. The outdoor monitoring station was mounted on a tripod with air sampling at roughly 2 m height and the station placed at least 3 m from any exterior wall or pollutant source such as a grill. Outdoor formaldehyde and NO_X passive samplers were placed inside a 10 cm diameter PVC cap for rain protection. The ES-642 photometer is housed in a weatherproof enclosure that incorporates a sharp-cut cyclone to exclude particles larger than 2.5 μm aerodynamic diameter and an inlet heater to maintain a minimum relative humidity in the incoming sample stream; it also auto-zeroes each hour. Monitors used to collect time-resolved air quality data were purchased new at the start of the study and thus expected to perform according

to manufacturer specifications. Performance checks during the study are summarized below and additional details are provided in the SI.

For the CO_2 monitors, an initial visual check was conducted by operating all units together in the warehouse used to prepare equipment for Northern California homes; but no formal calibration was conducted at that time. In most homes, CO_2 monitors were collocated during setup and confirmed to read within 100 ppm of each other before deployment. Extech CO_2 monitors were checked against a calibrated PP Systems EGM-4 monitor during two collocation events at LBNL, as described in the SI. Averaged over full spike-decay intervals, differences between individual Extech units and the EGM-4 ranged from -20 ppm to 84 ppm. No corrections were made to CO_2 data and the possibility of larger deviations in some homes cannot be ruled out.

The ES-642 and BT-645 are aerosol photometers that translate light scattering measurements to an estimated $PM_{2.5}$ concentration based on a device-specific laboratory calibration using a traceable reference of 0.6 μm diameter polystyrene latex spheres. Since photometer response varies with aerosol size distribution and optical properties, their accuracy for ambient (outdoor) or indoor $PM_{2.5}$ can vary substantially as the qualities of the aerosol vary[10-14]. The recommended practice is to conduct a collocated gravimetric $PM_{2.5}$ measurement and determine an environment specific adjustment factor. In this study, we sought to check both the calibration factor and the time-response of the Met One photometers by deploying Thermo pDR-1500 photometers with onboard filter sampling indoors and outdoors at 8 homes. Due to power interruptions, valid outdoor co-location data were obtained at only 5 homes and the results were too varied to provide study-wide adjustment factors. To fill this gap, we obtained data from up to three regulatory air quality monitoring stations closest to each house (Figure S1 of the SI) and calculated outdoor $PM_{2.5}$ for the study period at the house. As a second check on performance, at most homes the indoor and outdoor photometers were operated side by side (typically outdoors) for roughly an hour (Figure S2). Details about quality assurance for the air quality monitors are provided in the SI.

The standard software for the formaldehyde FM-801 monitor reports readings below 10 ppb as "<LOD". By special arrangement, GrayWolf provided modified software to enable us to access device readings below this nominal detection limit, which we used in 25 homes. Prior research indicates that the device may provide quantitative if more uncertain measurements below 10 ppb[15]. Some FM-801 formaldehyde was removed because of interference by high NO_2[16] from gas cooking burner use. Details about both adjustments are provided in the SI.

Duplicates and field blanks were collected to evaluate reliability for the passive samplers, and all available duplicate samples were averaged to improve precision. Four Ogawa samplers prepared according to manufacturer protocols were deployed at each home to measure NO_2 and NO_X: one outdoors, two at the central indoor station (duplicates), and one field blank. The field blank was opened either at the indoor or outdoor station, then packaged and stored in a refrigerator for the monitoring week. At least four UMEx 100 formaldehyde samplers were deployed at each home: one outdoors, two in the central indoor station (duplicates) and one in the bedroom. In most of the sampled homes, a fifth sampler was opened indoors as a field blank, then immediately packed and stored in a refrigerator during the monitoring week. The procedures used to analyze passive samplers are summarized in the SI. The sampling rates for NO_2 and NO_X samples were calculated based on measured average temperature and humidity according to Ogawa protocols. For UMEx samplers we used the sampling rate of 20.4 mL/min recommended by the manufacturer for air velocities <300 cm/min and 1 to 7 days of sampling. Offermann and Hodgson have shown that sampling rates for the UMEx and other passive monitors start to drop sharply when air velocity falls below about 75 cm/min[17]. Presenting measurements from six occupied houses and one unoccupied research house, Matthews et al.[18] reported that such low air velocities were infrequent. Since we did not measure velocities around the passive samplers and did not verify measured concentrations with pumped samples, it is possible that sampling rates could have been lower than the assumed standard values at some times in some homes.

Survey and Activity Log. Participants were asked to complete a survey about the household occupants and their general activities that impact ventilation and IAQ and also to complete an activity log for each day of monitoring. The survey was a condensed version of the online survey used to collect data about California detached homes built since 2002. Recruitment for the online survey was conducted primarily through emails sent by SoCalGas to customers who lived in homes that use natural gas and were thought to meet the requirement of being constructed in 2002 or later. A summary of findings from the survey is provided in the HENGH final project report[6]. The abridged survey tool used for the field study and the daily activity log are included in the SI to this paper.

Calculated Outdoor Air Exchange Rate (AER). The rate of outdoor air exchange – including both mechanical ventilation and air infiltration – was calculated minute-by-minute in each home following the Enhanced Model described in the 2017 ASHRAE Handbook– Fundamentals, as summarized in the SI. The calculation assumed that windows and doors were closed throughout the monitoring week (as required), so natural ventilation was negligible. The AER over the full monitoring period in each home was calculated as the harmonic mean of the minute-by-minute estimates. Measured AERs in CNHS houses[2] that did not have mechanical ventilation and did not open windows were analyzed to assess the accuracy of the infiltration portion of the AER calculation, as described in the SI.

3. Results and Discussion

3.1. Locations and Seasons of Home Visits

The field study collected data from 48 homes in the San Francisco Bay Area and Central Valley regions and 22 homes in Southern California, as shown in Figure 1. The breakdown by gas utility service territory, California climate zone, and city is provided in Table S3. Sampling occurred throughout the year, with slightly more homes visited in the months corresponding to summer seasonal conditions (June–September, n=27 homes) than each of the other seasons, in which 13

to 16 homes were studied (Table S4). None of the homes were within 300 m of a freeway, highway, or high-volume arterial road.

3.2. House and Household Characteristics

Characteristics of HENGH homes with selected comparisons to the CNHS and California data from the 2017 American Housing Study (AHS) are reported in SI Tables S5–S15 and Table 2. HENGH and CNHS samples had similar distributions of home size and occupant density; but HENGH homes were newer when tested and more commonly had gas cooking appliances (Table 2). HENGH included one 2.5-story, 42 two-story, and 27 one-story houses (Table S8) and all but one had an attached garage. HENGH homes mostly had three (n=20), four (n=28) or five (n=17) bedrooms and almost all had multiple bathrooms (Tables S9–S10). Thirty-two HENGH homes had vented gas fireplaces (Table S11).

HENGH households were similar in size to the AHS, with slightly more having 1-2 occupants (46% vs. 41%), fewer with 3-4 occupants (34% vs. 42%) and similar 5+ occupants (17% vs. 15%) (Table S12). HENGH households had similar age demographics as the AHS, with 40% of each having at least one resident under age 18 and 26-28% with at least one resident aged 65 or older (Table S13). Relative to the AHS, the HENGH sample was skewed in terms of income and education. In HENGH, 88% of the 66 participants who provided the information had a household income of $100,000 or greater; in the AHS sample, only 60% reported such income (Table S14). Of the 67 HENGH heads of household that reported education level, 88% had a college degree and 54% had a graduate or professional degree; in the AHS, 56% had someone with a college degree and 26% had someone with a graduate or professional degree (Table S15).

With the important caveat that the CNHS asked about medically diagnosed conditions and HENGH asked simply about the conditions, HENGH households more commonly reported someone with allergies (56% vs. 36%) or asthma (26% vs. 16%); CNHS also reported chemical sensitivity in 3.7% of homes (HENGH survey did not ask about this condition).

3.3. Envelope Air Tightness

The distribution of measured envelope air tightness, expressed as the air changes per hour at a 50 Pascal indoor-outdoor pressure difference (ACH50), are shown in Figure S3. The mean, median, and 10^{th}–90^{th} range of envelope air tightness from depressurization tests were 4.6, 4.4, and 3.4–6.0 ACH50. Measured air leakage under pressurization was higher than depressurization by 20% on average due to "valving" of some air leakage pathways, e.g., from exhaust fan backdraft dampers being pushed open during pressurization. Only four homes had envelope leakage less than 3 ACH50, the level required for compliance with the 2018 International Energy Conservation Code. Overall, HENGH homes had air leakage values similar to California homes built in the early 2000s, as reported in the online residential diagnostics database (resdb.lbl.gov)[19] and in the CNHS, which had a mean ACH50 of 4.8.

3.4. Ventilation and Filtration Equipment

All 70 HENGH homes had ventilation equipment that was mostly or completely compliant with the statewide standards. As summarized in Table S16, dwelling unit ventilation was provided by an exhaust system in 64 homes and by a supply system in 6 homes. Fifty-five of the exhaust systems used a continuous fan and 43 of those exhausted air from the laundry room; the others exhausted from a bathroom. Three of the exhaust systems had remote fans located in the attic and the others were upgraded laundry or bath exhaust fans. All supply systems were integrated into the central forced air heating and cooling system; four had inline fans and two relied on the central system fan operating on a timer to pull in outdoor air through a duct connecting the return to the outdoors. In all but two of the homes with measured airflow, the flow exceeded the code minimum requirement. The mean minimum requirement was 107 $m^3\ h^{-1}$ and the mean installed flow was 163 $m^3\ h^{-1}$, about 50% higher. In many homes, the "extra" airflow could be explained by use of a common fan size set to maximum capacity, i.e., not adjusted down to meet minimum requirements. Very importantly, the general ventilation equipment was running in only 26% of homes (18/70) when the field researcher(s) arrived for the initial visit. Systems with easily

understandable signage at the power switch for the system were much more likely to be operating (see Table S17).

All of the homes had exhaust fans in the kitchen and in each bathroom, as required by the standards. Kitchen ventilation was provided by a range hood in 32 homes and an over the range (OTR) microwave in 38 homes. Twenty-two (69%) of the range hoods moved the required 50 L s^{-1} or 100 cfm on the lowest speed setting, seven met the standard on a medium setting, and three did so only at the highest setting. Of the 38 OTRs for which airflows were measured in homes, method correction factors were obtained and applied to 22 devices. For this group, the estimated airflow met the code requirement for 8 installed units (36%) on the lowest setting, 14 (64%) on a medium or higher setting, and 20 (91%) on high or boost setting. The setting needed to produce the required airflow is important because the code also requires that the fan operate at a sound level of 3 sone or less, with the rationale that kitchen exhaust may not be used as needed if it is too loud. Over 85% of the full bathrooms had exhaust fans that met the requirement of 25 L s^{-1} or 50 cfm, as shown in Figure S4. Exhaust fans in the toilet room or shower of the master bathroom suite are not required to meet the airflow standard if the main exhaust fan in the bathroom suite does so. These fans had lower measured airflows and only 60% met the 25 L s^{-1} benchmark. The median exhaust flows were 41, 37 and 31 L s^{-1} (87, 78 and 65 cfm) for master bath, other bathroom and toilet/shower compartments.

Of the 69 homes with a forced air thermal conditioning system, 22 had only one filter, 34 had two filters, 10 had three filters and 3 had four or more filters (with one filter per return duct). As shown in Table S18, 96% (107/111) of the filters for which a performance rating could be determined were MERV8 or better and 30% (33/111) were MERV11 or better. In the CNHS, filter ratings were determined in 97 of the 108 homes: 49% (48) had MERV8 or better and 32% (31) had MERV11 or better. In HENGH homes, we were able to determine the last date of change for 85 filters: 58% (49) had been changed within the last 6 months, 22% (19) had not been changed in the past year and 11 of those had never been changed (Table S19). Table S20

shows that 20 homes had filters that were clean or like new, 29 homes had filters that appeared used or somewhat loaded, and 18 homes had at least one very dirty filter. There were a few homes in which, at the owner's request, the research team replaced (n=2) or installed (n=1) air filters in the forced air systems during the first or second field visit, prior to monitoring.

3.5. Ventilation During the Week of Monitoring

Field teams set dwelling unit mechanical ventilation systems to operate during the monitoring period in each home. The two homes with supply ventilation powered by their central thermal conditioning system fans were ventilated during the study by running their laundry exhaust fans continuously. The average air exchange rate (AER) resulting from infiltration and mechanical equipment operating during the monitoring week was estimated for 63 homes, with results provided in Figure S5. AER was not estimated for four homes with supply ventilation fans because the system airflow could not be measured and for three homes that did not have a valid envelope air leakage measurement, which is needed to calculate infiltration. Five homes that had their dwelling unit exhaust fans stopped (presumably turned off by occupants) during the week had low calculated AERs: 0.07–0.15 h^{-1}. A sixth home, which had an intermittent exhaust fan that was not programmed to provide sufficient ventilation (by error of the field team), also had a low AER, of 0.06 h^{-1}. For the 57 homes that had measured airtightness and mechanical ventilation system airflows and their systems operated throughout the week of monitoring, the mean, median and 10^{th}–90^{th} percentiles of the estimated infiltration + mechanical AERs were 0.33, 0.30, and 0.20–0.46 h^{-1}. Mechanical ventilation provided substantially higher outdoor air exchange rates than would have occurred by infiltration only, as shown in Figure S6.

The AERs estimated for HENGH homes operating with code-compliant systems and windows presumed closed were marginally higher than in the CNHS (before ventilation was required), which reported sample median AERs of 0.26 h^{-1} for 107 homes measured during a single monitoring day and 0.24 h^{-1} for 21 homes measured over a 2-week period that included window use. Twenty-two CNHS homes had mechanical equipment to provide dwelling unit ventilation;

these included 8 with heat recovery ventilators (HRV) and 14 with ducts connecting the forced air heating/cooling system return duct to the outdoors. Of the 14 with outdoor air ducts, only 4 had controllers to operate the FAU for mechanical ventilation when no heating or cooling was needed. During the day of CNHS monitoring, all of the HRVs but only 34% of the outdoor-connected FAU systems met the ASHRAE 62.2-2004 standard applicable at the time.

In several of the HENGH study homes, the actual outdoor air exchange over the week was likely higher than the calculated values owing to use of natural ventilation. In six homes, the occupants reported opening the house-to-patio and/or garage door(s) for more than 3 h per day on average. The calculated AERs also could be roughly 20% higher based on the potential bias in infiltration calculation indicated by the analysis of CNHS data from homes without mechanical ventilation.

3.6. Sources of Air Pollutants Reported in the General Survey

Almost all HENGH homes reported being completely smoke free; one reported that smoking occurred a few times per year and one acknowledged informally that a family member smoked daily in a bedroom, with the window open. Occasional candle burning was fairly common, with 16 HENGH participants reporting candle use a few times per month, 11 using a few times per week, and 5 every day (Table S21). Thirty-four households had at least one furry pet and twelve reported two or more; 20 reported no pets and 16 did not respond to the pet question (Table S22).

3.7. Occupancy and Activities During the Week of Monitoring

Data from the HENGH daily activity logs are provided for occupancy (Tables S23–S24) and cooking (Tables S25–S27). Most of the homes had one to three occupants at home at any given time when occupied and 88% of those reporting were occupied during time intervals totaling 16 or more hours per day on average. Thirty-four of 68 homes with daily log data reported using the cooktop at least 7–14 times per week; oven use was less common. Cooktop use events were <30 min on average in most homes. Oven use was typically longer. Cooking and other activities reported in the CNHS homes are provided in Table S28.

3.8. Air Pollutant Concentrations: Formaldehyde

Multiple measurements of formaldehyde in each HENGH home indicated very good sampling precision and mostly similar concentrations in the master bedroom and central indoor sampling location. The average mass on field blanks corresponded to 0.6 ppb for a 7-day collection period and the 66 paired indoor samples agreed to within 1.0 ppb on average (median = 0.7 ppb). Sample-period averaged concentrations calculated from half-hourly resolved GrayWolf (Shinyei) multimode monitor data agreed well with the time-integrated sampler results as summarized in Table S29 of the SI. Figure 2 presents the formaldehyde concentrations measured in the master bedrooms and central indoor locations of each home by UMEx passive sampler. Among the 66 homes with valid samples in both locations, formaldehyde in the bedroom was >10% higher than in the living room in 20 homes and less than 90% in 7 homes. The median and 10^{th}–90^{th} ratios of bedroom to living room concentrations were 1.02 and 0.90–1.27. Period-averaged formaldehyde determined by the multimode monitor indicated a similar trend of the master bedroom having higher concentrations than the central area more frequently than the opposite. And the overnight concentration in the bedroom was even higher than the period-average at that location. (See SI for details). These findings suggest that for many people exposure to formaldehyde at home may be higher than indicated by average concentrations at a central indoor site.

Figure 3 shows that homes built in 2011–2017 and mostly operating with mechanical ventilation (HENGH) had formaldehyde concentrations substantially lower than those built in 2002-2005 and mostly not using mechanical ventilation (CNHS). Mean and median formaldehyde levels in HENGH homes were 44% and 38% lower than in CNHS (Table 3). Differences between the HENGH and CNHS indoor formaldehyde concentrations were found to be significant based on a two-tailed Student's t-test with equal variance comparing log-transformed concentrations (p-value = 3.4e-8) and the nonparametric Mann-Whitney test (p-value = 1.5e-7). The highest formaldehyde measured in any home in the current study was 44 ppb while 28% of the CNHS homes had a formaldehyde concentration over 44 ppb. Indoor emissions were the primary source

in both studies; but based on median indoor and outdoor values, the fraction contributed by outdoor air increased from 6% in the mid-2000s to 15% more recently.

Formaldehyde levels in HENGH homes were all well below the World Health Organization (WHO) indoor air guideline of 80 ppb and also below non-U.S. national guideline levels as summarized by Salthammer [20]. However, all homes were still above the 7 ppb (9 $\mu g/m^3$) Chronic Reference Exposure Level set by the California Office of Environmental Health Hazard Assessment, which is the applicable target in California.

The substantial reduction in formaldehyde compared to the CNHS a decade earlier appears to result both from fewer homes being severely under-ventilated and from lower emissions. For 32 CNHS homes with measured air exchange rates below 0.2 h^{-1}, mean and median formaldehyde concentrations were 57 and 45 ppb. By contrast, in the HENGH dataset, only eight of the 63 homes for which overall AER was estimated had outdoor AERs below 0.2 h^{-1}; and the mean and median formaldehyde concentrations for these homes were 25 and 23 ppb.

Formaldehyde emission rates were calculated for 61 HENGH homes using the measured concentrations and estimated AERs. The median and mean emission rates were 5.8 and 6.1 $\mu g/m^3$-h compared to median and mean values of 11 and 13 $\mu g/m^3$-h calculated from 99 homes with the required component data in CNHS (Table 45 of Offermann et al., 2009). CNHS homes had more varied formaldehyde emission rates, with a 10^{th} to 90^{th} percentile range of 4.0 to 23 $\mu g/m^3$-h whereas the range for HENGH homes was 2.8 to 8.3 $\mu g/m^3$-h. For this comparison, it is important to note that the CNHS measured AERs with a PFT tracer gas whereas the HENGH AERs were estimated by combining the measured mechanical ventilation airflows and calculated air infiltration assuming no contributions from open windows or door. To the extent that actual AERs in HENGH homes were higher than calculated – e.g. from a possible ~20% bias in the calculated air exchange rates as discussed in the SI, or from use of windows and doors – the formaldehyde emission rates in HENGH homes would have been higher than stated above.

3.9. Air Pollutant Concentrations: Fine Particulate Matter ($PM_{2.5}$)

Time-resolved $PM_{2.5}$ concentrations reported by indoor photometers were adjusted based on comparison to gravimetric analysis of filter samples collected in 8 homes (Table S30). Indoor photometer measurements were adjusted by a multiplier of 1.23 for the BT-645, and 0.90 for the pDR-1500. Aside from the gravimetric adjustment, pDR-1500 also measured time-resolved $PM_{2.5}$ for comparison with BT-645. Hourly indoor readings from the 8 homes collected by the two photometers were highly correlated (R^2 = 0.96-0.99) and, after applying the respective multipliers, agreed to within ±1 μg/m^3 for 84% of the hourly readings, and ±2 μg/m^3 for 96% of the hourly readings.

Distributions of indoor $PM_{2.5}$ in HENGH and CNHS are shown in Figure 4. Mean and median indoor $PM_{2.5}$ concentrations in HENGH were 44% and 54% lower than in CNHS homes (Table 3). Even with uncertainty in the photometer adjustment factors, these data indicate substantially lower indoor $PM_{2.5}$ in the more recently constructed homes. The difference in log-transformed indoor $PM_{2.5}$ concentrations measured by the two studies are statistically significant using Student's t-test (p-value = 2e-6) and nonparametric Mann-Whitney test (p-value = 2e-5).

Since outdoor air is a major source of $PM_{2.5}$ inside U.S. homes[21-25], it is important to consider if the observed difference could be entirely attributed to lower $PM_{2.5}$ outdoors during HENGH. The CNHS reported 11 samples of outdoor $PM_{2.5}$; based on the clustering sampling approach used in that study, those measurements represent 28 homes. For the HENGH study, the 5 weeks of collocated outdoor photometer and gravimetric samples had such varied ratios (see Table S30 of SI) that they could not be used to adjust all of the outdoor photometer data. Data from regulatory ambient air monitoring stations nearby to HENGH homes provide a second set of estimates of areawide outdoor $PM_{2.5}$ during the study. Table S31 and Figure S7 of the SI show that outdoor $PM_{2.5}$ estimates from the air monitoring stations are higher than those from unadjusted outdoor photometer data. This is directionally consistent with outdoor photometer reading lower than the indoor photometer in side-by-side monitoring and suggests that the outdoor photometer may be

understating the outdoor $PM_{2.5}$. Summary statistics of outdoor $PM_{2.5}$ from both data sets applied for the HENGH study are compared to CNHS data in Table 3. While limitations of both data sets make the comparison uncertain, the results in Table 3 do not indicate substantially lower $PM_{2.5}$ outside of HENGH versus CNHS homes. The lower $PM_{2.5}$ inside HENGH homes can therefore not be attributed to lower outdoor $PM_{2.5}$.

The lower indoor $PM_{2.5}$ in HENGH homes could result from reduced penetration of particles during air infiltration, lower indoor emissions (from cooking, candles, cleaning, etc.), more effective kitchen ventilation, and/or improved filtration. Reduced particle entry during air infiltration is not likely a major factor as the envelope air tightness was very similar in the two samples and the higher median outdoor air exchange rates in the HENGH study would tend to slightly increase indoor concentrations of outdoor particles as higher AERs bring in outdoor air more quickly and leave less time for particles to deposit onto indoor surfaces.

Assessing the impact of filtration overall requires consideration of filter quality, airflow and operating cycles of the central forced air system, and use of portable air filtration units. While the full analysis is beyond the scope of this paper, it was reported above that HENGH homes more commonly had at least a medium performance (MERV8) filter compared to CNHS homes. There also may have been more portable air cleaner use in HENGH homes. Of the 64 HENGH participants who answered the question, 14 (22%) reported using a standalone air cleaner. Air cleaner use was self-reported in 17% of CNHS homes and 15% of respondents to the statewide survey in 2002-4[1].

While it is difficult to compare the impact of all particle emitting activities – since emissions vary so widely even for a defined activity – we can at least compare the frequency of cooking and range hood use. In the CNHS study, during the day of IAQ monitoring, 87 homes (81%) reported at least one use of the cooktop or oven and 81 (75%) reported at least one cooking event involving frying, sautéing, baking or broiling. Despite this relatively high frequency of cooking that can emit substantial quantities of $PM_{2.5}$, only 22% of the CNHS occupant activity logs

reported any range hood use during the day of IAQ measurements and 44% reported some range hood use during the prior week. Over the roughly one-week monitoring in HENGH homes, 34 of the 68 submitted activity logs (50%) reported cooking with the cooktop or oven at least 7 or more times during the week, i.e. once per day on average. The HENGH activity log did not ask about the type of cooking. In the general survey responses, 50% of HENGH participants reported using their range hood "most of the time" (4 of 5 times) or more and another 23% reported using the range hood "sometimes" (2–3 out of 5 times). Initial analysis of cooktop temperature and range hood/OTR use data indicate that kitchen ventilation was employed in some capacity during roughly 29% of cooktop uses and 22% of oven uses and actual use during the monitored week was much less than usage reported by survey. The range hood was operated for most or all of the duration of cooktop use during 8% of cooktop use events and 3% of oven use events.

3.10. Air Pollutant Concentrations: Nitrogen Dioxide and Nitric Oxide

Distributions of NO_2 concentrations inside HENGH and CNHS homes are presented in Figure 5 and summary statistics are provided in Table 3. The distributions were not significantly different based on the nonparametric Mann-Whitney test (p-value = 0.08) and the means of the log-transformed data were not statistically different using the Student's t-test (p-value = 0.15). This occurred despite all HENGH homes having natural gas cooktops (compared to just 2% of CNHS homes) and outdoor NO_2 being higher in HENGH. The higher median indoor NO_2 in HENGH may be misleading as the CNHS median was in the group of data set as half of the quantitation limit and the outdoor median for CNHS was lower (though uncertain for the sample as NO_2 was sampled outside of only a subset of homes). Differences in NO_2 between HENGH and CNHS homes were much smaller than those reported for homes with gas versus electric cooking in a recent study of mostly older and smaller California homes [5]. The highest weekly averaged NO_2 measured in a HENGH home was below the California annual average standard of 30 ppb and less than half of the U.S. annual air quality standard of 53 ppb. Figure S8 shows that for NO, indoor concentrations were almost always higher than outdoors, as indoor emissions added to the

NO coming from outdoors. For NO_2, deposition indoors resulted in indoor concentrations being lower than outdoors in many homes.

3.11. Air Pollutant Concentrations: Carbon Dioxide as Indicator of Adequate Ventilation

Overall, time-averaged CO_2 levels measured in HENGH and CNHS homes were similar, as presented in Table 3. The one substantive difference – at the 90th percentile – aligns with mechanical ventilation systems in HENGH homes more consistently providing outdoor air to dilute occupant emissions of CO_2.

Within HENGH homes, CO_2 concentrations varied spatially (Figure 6). The highest time-averaged concentrations were in the master bedroom and concentrations in other bedrooms were higher than in the main indoor living space.

CO_2 concentrations also varied in time, with the highest concentrations occurring overnight in bedrooms. Figure 7 shows the distributions of average CO_2 concentrations in each room, looking only at data from midnight to 5 am, and SI Figure S9 presents overnight CO_2 concentrations measured in the main indoor location and master bedrooms of the same houses. These results indicate that CO_2 in HENGH bedrooms did not reach the levels that have been reported to affect sleep or next day alertness[26, 27].

3.12. Satisfaction and Discomfort with Indoor Environmental Conditions

Sixty-eight of the 70 HENGH study participants provided responses to survey questions about their satisfaction with environmental conditions in the home. Responding to the question "To what extent are you satisfied or dissatisfied with the indoor air quality in your home?", 68% (n=46) selected one of four levels indicating positive satisfaction, 24% (n=16) selected neutral, and 9% (n=6) marked one of four levels indicating dissatisfaction. These results are very similar to those obtained from 2765 respondents to the online survey of people living in California homes built before ventilation standards were in place. That survey, conducted in 2014, was open to occupants of California homes built since 2002; yet almost all respondents lived in

homes built before 2011 and located in the SoCalGas service territory of Southern California[6]. In the online survey, 69% indicated positive satisfaction, 21% were neutral, and 10% indicated dissatisfaction with their IAQ. Among 68 field study respondents, 51% were satisfied with the air quality *outside* of their homes, 17% were neutral and 32% were dissatisfied. These totals are also similar to the online survey, for which 47% were satisfied, 27% were neutral and 26% were dissatisfied with their outdoor air. When asked "How would rate you rate your home in protecting you from outdoor air pollution?" 62% of responding field study participants were satisfied, 31% were neutral and 7% were dissatisfied. The CNHS did not report results for IAQ satisfaction and the survey reported by Piazza asked about "acceptability" of indoor air quality, rather than "satisfaction", which is not directly translatable.

The survey of HENGH participants – both field study and online – also asked about the frequency of specific environmental discomforts, offering options of "never", "few times a year", "few times a month", "few times a week", and "every day". The CNHS study asked participants if they experienced discomfort during the preceding week. Table 4 shows that specific discomfort conditions were generally similar in the two studies, with the exception that 21% of HENGH participants reported not enough air movement compared to 12% of CNHS participants experiencing the air as "too stagnant" in the week prior. The robustness of that difference is unclear as 18% of the survey respondents from homes built around the same time as those in the CNHS also expressed frequent dissatisfaction with air movement.

Survey responses from the field study were analyzed to evaluate if environmental satisfaction differed in homes that had MV systems operating or not operating when the research team first arrived to study homes. Results provided in Tables S32 to S34 indicate no statistically significant associations with satisfaction for air quality, seasonal temperature, or other environmental conditions (air movement, dryness or dampness, musty odors).

3.13. Comparison to Other Studies of Ventilation and IAQ in Recent Construction Homes

There have been few large field studies examining the impact of mechanical ventilation on IAQ in recently constructed homes. The study that most directly addressed this topic examined 62 homes built in 2010-2012 to an Austrian efficiency standard that included general mechanical ventilation with heat recovery (MVHR) and 61 homes constructed during the same years using normal building standards without mechanical ventilation[28]. The study measured IAQ parameters roughly 3 months and 1 year after occupancy and used interviews to collect data about health symptoms and perceptions of IAQ and comfort[29]. The efficient homes with MVHR had lower concentrations of total volatile organic compounds (TVOC), formaldehyde, saturated acyclic aliphatic aldehydes, CO_2, and radon[28]. While there were not significant differences in self-reported overall health status or for most symptoms, occupants of the efficient, ventilated homes rated their environmental quality higher by more frequently noting positive attributes (pleasant, clean, fresh and fragrant) and less frequently perceiving negative attributes (stale, stuffy, stagnant, bad smelling or smoky)[29].

The effects of improving ventilation in existing airtight homes was reported by Lajoie et al.[30] in a study that added mechanical ventilation with heat or enthalpy recovery to 43 of 83 Quebec area homes of asthmatic children that were verified to be under-ventilated. IAQ parameters and the children's respiratory health were monitored over two years. The homes with added mechanical ventilation had several statistically significant and substantial (>25%) improvements including higher outdoor air exchange and lower CO_2, formaldehyde, styrene, limonene and mold spores; but also had higher indoor NO_2 and di(2-ethylhexyl) phthalate.

Several studies have reported on the installed performance of mechanical ventilation systems in modern homes. A study of mechanical ventilation systems in 299 Dutch homes completed in 2006-2009 conducted visual inspections, measured ventilation rates per room and equipment noise, and asked occupants their perceptions of their indoor air quality[31]. Issues identified in many homes included ventilation rates below and noise levels above building code requirements,

blocked supply vents, and absence of required controls. Problems occurred during installations, maintenance and operations. A study in Belgium[32] conducted mechanical ventilation system diagnostics and measured carbon dioxide, temperature and humidity levels in 39 standard construction homes built in 2007-2008 with wet room exhaust ventilation and trickle vent supplies (and mean air leakage of 3 ACH50), 23 similarly tight (2 ACH50) low-energy homes with MVHR, and 16 passive houses (0.5 ACH50) with MVHR. Installed equipment in many of the homes did not achieve the required airflows at any setting and occupants generally operated the systems at lower settings, leading to large differences between actual and design airflows. Humidity and CO_2 measurements showed some differences between groups of homes but none indicated substantial problems. In a study of 29 homes in the U.S. state of Washington, which has required mechanical ventilation for many years, researchers reported that most had systems that were set, or that could be set to comply with the standard[33]. In many of the homes the MV systems were not operating according to design standards when researchers first arrived. A study of mechanical ventilation systems installed in 21 homes in the U.S. state of Florida[34], which did not require such systems at the time, found that only 12 were capable of operating and actual airflows generally were well below design targets. These two U.S. studies reported problems with installation (disconnected duct, blocked vent, poorly hung ducts, inoperable outdoor air exhaust duct damper, ERV/HRV system installed backward) and operations and maintenance (fan turned off, dirty filters, controller set to inadequate runtime fraction).

Among the air pollutants measured in HENGH, the most direct comparisons to prior U.S. studies can be made for formaldehyde. HENGH homes had substantially lower formaldehyde than a sample of homes constructed in the late 2000s with low-VOC flooring and paints along with mechanical ventilation; those homes had mean formaldehyde of 27 ppb (33 $\mu g\ m^{-3}$) at adjusted conditions of 23ºC, 43% RH, and 2.25 years old[35]. In a study in the U.S. state of Arizona, apartments that were renovated in 2011 with low-VOC materials and mechanical ventilation had reported mean(SD) and median formaldehyde levels of 27(7) ppb and 26 ppb roughly 1 year

after renovations[36]. These levels represented a decrease from pre-retrofit formaldehyde of 39(11) ppb and 38 ppb (ibid). The higher concentrations measured in these studies relative to HENGH could result from sampling occurring only during daytime hours in the summer season, a time at which emissions are expected to be higher than concentrations measured over full diurnal cycles and varied seasons[37]. The lower concentrations in HENGH homes could also result in part from lower emissions resulting from the California air toxic control measure.

3.14. Limitations

The samples of homes included in the HENGH and CNHS studies may not accurately represent the population of recently constructed homes in the state now or in the mid-2000s. Relative to the general population of new home owners, HENGH households were biased toward higher income and higher education and potentially also toward higher interest in IAQ (since they volunteered to participate in the study). The impact of these biases is not known.

Even within the homes studied, the air quality measured in both HENGH and CNHS may not accurately reflect average conditions. In the HENGH study, IAQ was measured while homes were operated without natural ventilation (i.e., with occupants agreeing to keep windows and doors closed) and with mechanical ventilation systems set to operate. This mode likely does not represent conditions in newer California homes throughout the year, especially since we found that general ventilation systems were not operating in 74% of the homes studied. This was not an issue for CNHS because occupants were asked to use natural ventilation as normal. For both studies, the act of participating could have changed occupant activities that impact indoor air quality. Since CNHS sampling occurred over a single 24 h period, occupant routines may have been impacted by modified schedules to accommodate sampling equipment installation, removal and diagnostics on subsequent days. The processes of completing surveys and activity logs and having monitoring equipment in the homes could have impacted behaviors in both studies. Between study differences in recruitment, sample design and measurement methods also may have impacted the relative results in HENGH and CNHS.

For the HENGH study, ventilation rates were not directly measured as they were in the CNHS. The ventilation estimated by combining calculated infiltration rates and measured mechanical airflows in the HENGH study would be biased low in any homes with sustained opening of doors and/or windows for natural ventilation.

4. Conclusions

Measurements were conducted in 70 single-family, detached homes constructed in 2011–2017 under California building standards that require mechanical ventilation and a separate regulation that limits formaldehyde emissions from composite wood products. All homes had mechanical ventilation equipment that was mostly or completely compliant with the requirements. With the general mechanical systems operating and most homes not using any natural ventilation, indoor air pollutant levels were generally lower than those measured in a prior study of otherwise similar California homes built before the ventilation and material emission standards took effect. The recently constructed homes had somewhat lower $PM_{2.5}$, much lower formaldehyde, and slightly higher NO_2 despite having gas cooking burners whereas homes in the prior study had electric cooking. IAQ satisfaction was also similar in the newer homes as compared to homes built in years prior. These results indicate the success of standards that limit formaldehyde emissions and require ventilation systems to maintain acceptable IAQ.

Table 1. Measured Air Quality Parameters[1]

Measurement Device	Para-meters	Accuracy[1]	Res.	Sampling Locations
Met One ES-642 Photometer	$PM_{2.5}$	± 5% traceable standard with 0.6 um PSL	1-min	Outdoor
Met One BT-645 Photometer			1-min	Indoor: central
Extech SD-800 Infrared	CO_2, T, RH	±40 ppm <1000; ±5% >1000ppm; [2] ±0.8°C ±4% below 70%; 4% of reading + 1% for 70–90% range	1-min	Indoor: central, master BR, other BR
Ogawa Passive Samplers	NO_2 and NO_X	Field validation[3]: 7 d rel. dev.: 3±2% NO_2 at 11-37 ppb; 4±3% NO_X at 16-85 ppb; 10±9% (NO_X-NO_2) at 4-56 ppb	1-week	Outdoor; Indoor: central
Aeroqual 500 Series Electrochemical	NO_2	± 0.02 ppm within 0 to 0.2 ppm range	1-min	Indoor: central
GrayWolf FM-801 (Shinyei Multimode)	HCHO	± 4 ppb <40 ppb, ± 10% of reading ≥40 ppb	30-min	Indoor: central, master BR
SKC UMEx-100 Passive	HCHO	± 25%, exceeds OSHA requirements	1-week	Outdoor; Indoor: central, master BR
Onset HOBO UX100-011 Onset HOBO U23 Pro v2	T, RH	±0.21°C from 0° to 50°C ±2.5% from 10% to 90%; up to ±3.5% at 25°C including hysteresis	1-min	Indoor: central (UX100-011); Outdoor (U23);

[1] Based on manufacturer specifications unless noted otherwise. Table S1 in Supporting Information provides some additional information. [2] Manufacturer indicates ± 40 ppm for CO2<1000 ppm; the cited value of ±50 ppm reflects our group's experience (unpublished) with the monitors. [3] Field validation in California reported by Singer et al.[38]

Table 2. Selected House and Occupancy Characteristics[1]

Parameter	HENGH	CNHS
Year Built[2]	2011-2017	2002-2005
Monitoring	07/2016–04/2018	08/2006–03/2007
Age at Testing[3]	91% ≤3 years	90% ≤4.3 years
Floor Area (m^2)[4]		
Mean	244	248
Median (10^{th}–90^{th})	243 (146–339)	251 (160–339)
Density (m^2/person)		
Mean	88	90
Median (10^{th}-90^{th})	77 (45–143)	80 (48–142)
Gas Cooking Burners		
Cooktop / Oven	100% / 43%	2% / 27%

[1]Additional information in SI Tables S5-S15. [2]Table S5. [3]Table S6. [4]Table S7. [5]Others had electric cooking.

Table 3. Time-averaged pollutant concentrations in California homes built 2011-2017 (HENGH, current study) and 2002-2005 (CNHS, Offermann, 2009).

Location	HCHO	(ppb)	$PM_{2.5}$	($\mu g/m^3$)	NO_2	(ppb)	CO_2	(ppm)
Statistic	HENGH	CNHS[1]	HENGH	CNHS[1]	HENGH	CNHS[1]	HENGH	CNHS[2]
Indoor	N=68	N=105	N=67	N=28	N=66	N=29	N=69	N=107
Mean	19.8	35.0	7.5	13.4	5.8	5.2	620	610
Median	18.2	29.3	4.8	10.5	4.5	1.6	608	564
10^{th}–90^{th}	13–28	11–70	1.6–16	6.0–31	1.1–12	1.4–12	481–770	405–890
Outdoor	N=66	N=39[4]	N=67[3]	N=11[4]	N=65	N=11[4]	No data	No data
Mean	2.2	1.8	9.3, 10.5	7.9	5.4	2.1		
Median	2.3	1.7	6.8, 9.7	8.7	3.6	1.5		
10^{th}–90^{th}	1.4–3.1	0.6–2.8	2.7–18.1, 5.3–16.7	5.0–10	0.1–11	1.4–1.7		

[1] From CNHS "all-home" sample frame dataset. [2] From Table 39 of Offermann (2009). [3] The first set of outdoor values are from unadjusted, on-site photometer measurements over the full monitoring period at each home; the second set are from air quality monitoring stations nearby to the homes and use only the 24-h data from complete days during each monitoring period. [4] The CNHS collected one outdoor sample per cluster of 2-3 homes in close proximity. Outdoor formaldehyde collected at clusters for all 108 homes. Outdoor samples for $PM_{2.5}$ and NO_2 collected for clusters that included 28 homes total.

Table 4. Discomfort rates reported by participants in California homes built with code-required mechanical ventilation (HENGH), recent online survey of homes mostly built before dwelling unit ventilation was required, and field study of homes built before ventilation was required (CNHS).

Parameter	HENGH field study (n=68)[1]	HENGH online survey (n=2271)[1]	CNHS[2]
Too hot	Winter: 14% Summer: 31%	Winter: 10% Summer: 41%	19%
Too cold	Winter: 29% Summer: 4%	Winter: 20% Summer: 9%	15%
Too dry	9%	11%	8%
Too damp (HENGH) / too humid (CNHS)	1%	2%	2%
Too much air movement (HENGH) / too drafty (CNHS)	1%	5%	0%
Too stagnant / not enough air movement	21%	18%	12%
Too dusty	Not asked	Not asked	11%
Musty odor	1%	3%	13% in bathroom 1-3% other locations

[1] When asked how often does the discomfort occurs, respondent selected "few times per week" or "daily". [2] From Table 44 of Offermann (2009), respondents reporting that the discomfort occurred during 3 weeks prior. For musty odor, the CNHS asked if participants had "observed, seen or smelled mold" in the past week in various locations.

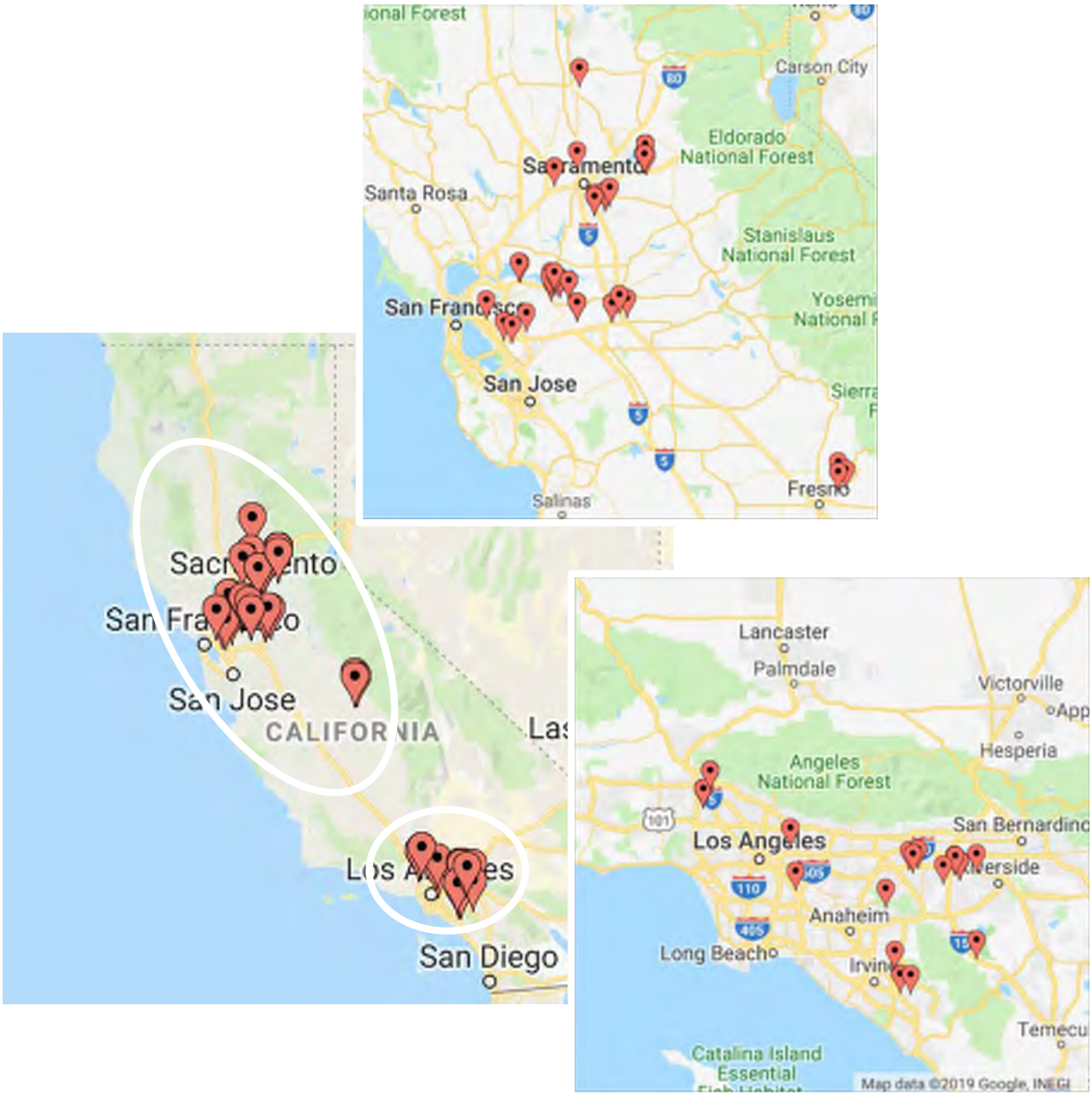

Figure 1. Locations of study homes.

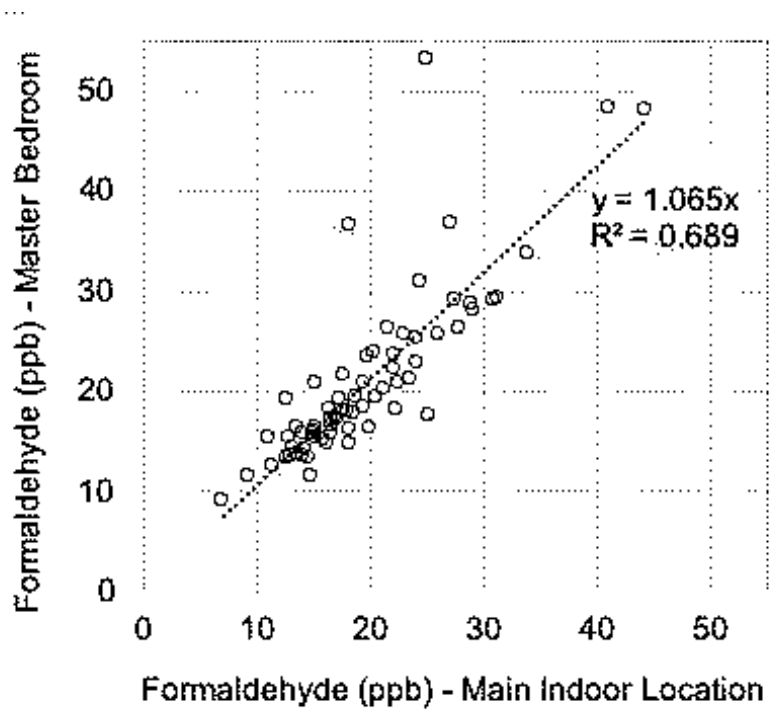

Figure 2: One-week integrated formaldehyde measured with passive samples: Comparison of concentrations in master bedroom and large, open common room (main) indoor locations

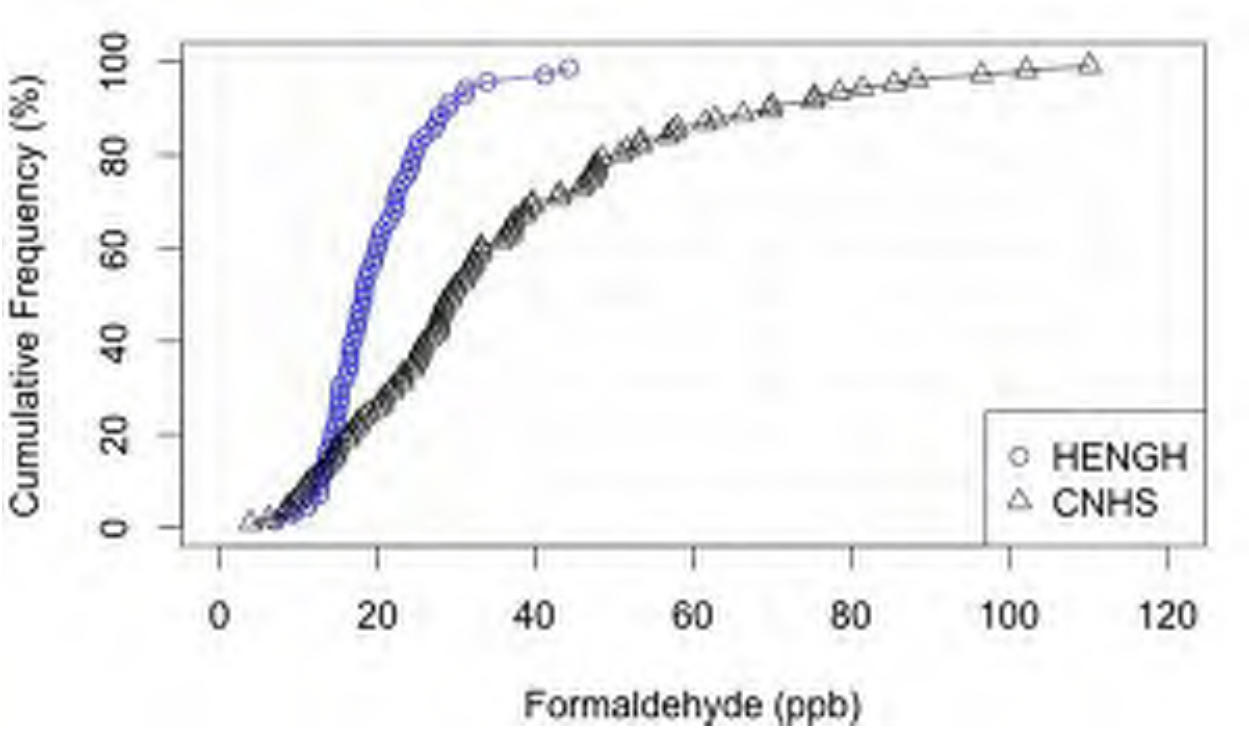

Figure 3: Time-Integrated formaldehyde concentrations measured in California homes built before (CNHS) and after (HENGH) mechanical ventilation was required.

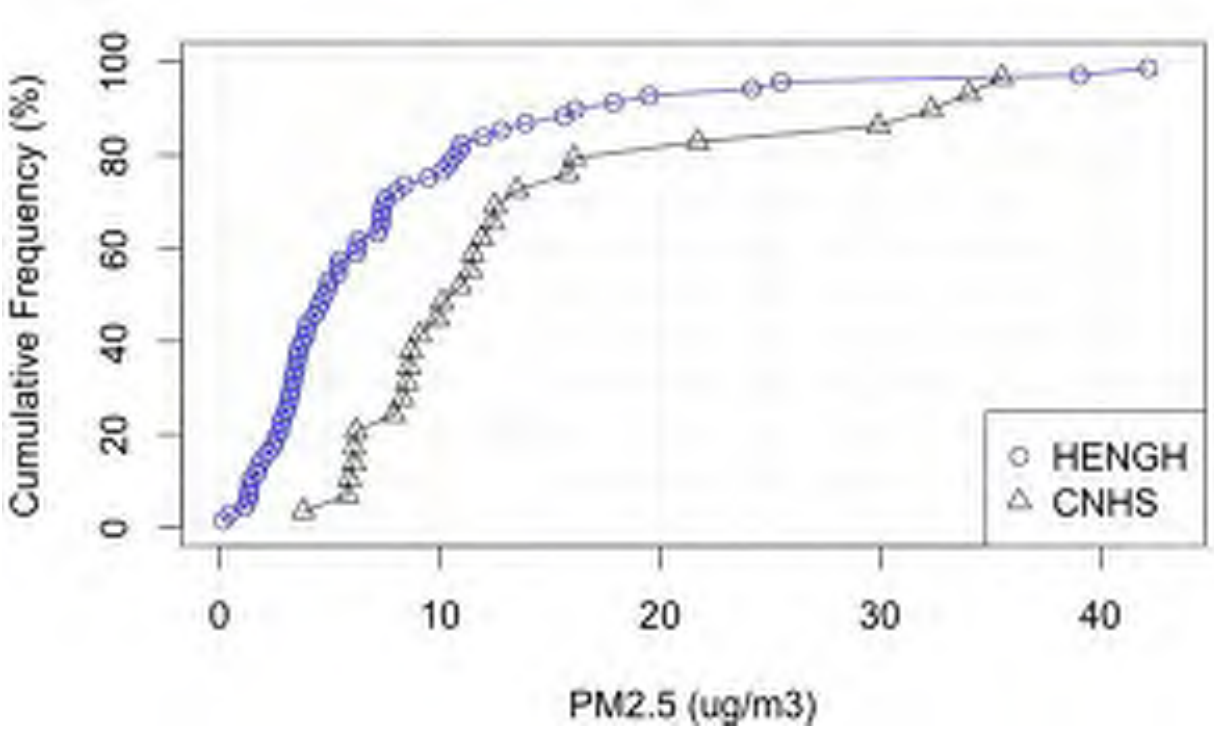

Figure 4: Time-averaged PM2.5 concentrations measured in California homes built before (CNHS) and after (HENGH) mechanical ventilation was required.

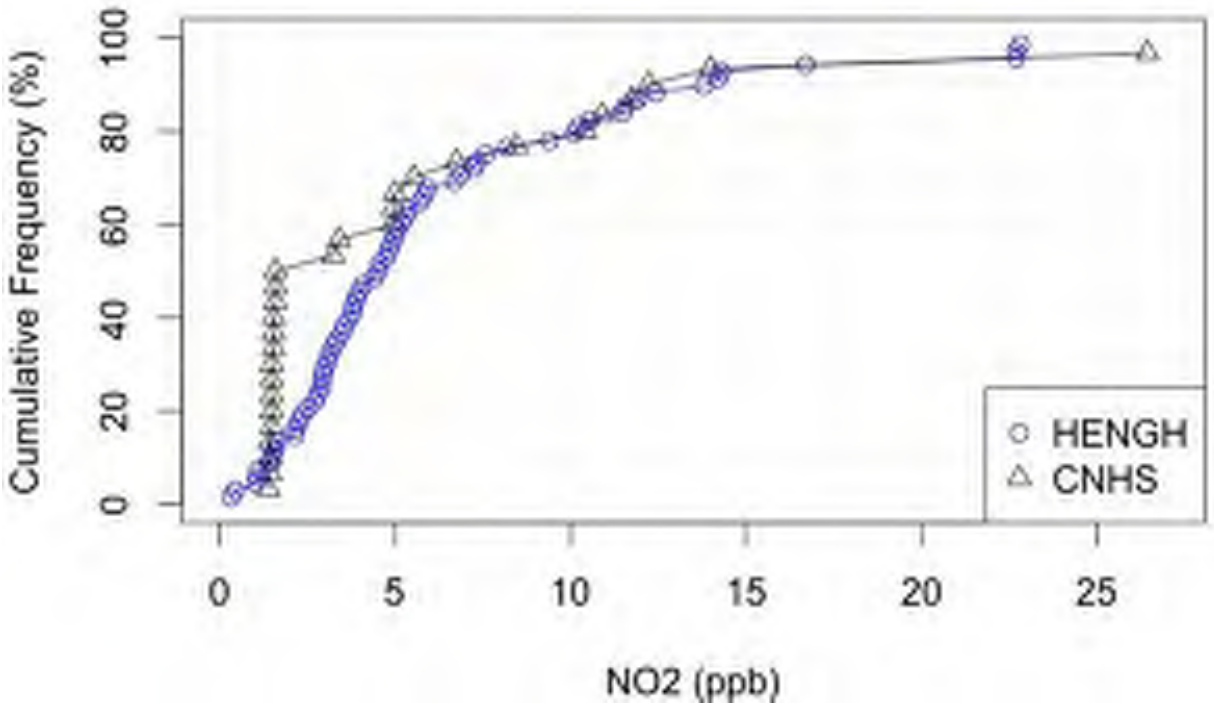

Figure 5: Time-integrated NO_2 concentrations measured in California homes built before (CNHS) and after (HENGH) mechanical ventilation was required. Most CNHS homes had electric cooking and all HENGH homes had gas cooking burners.

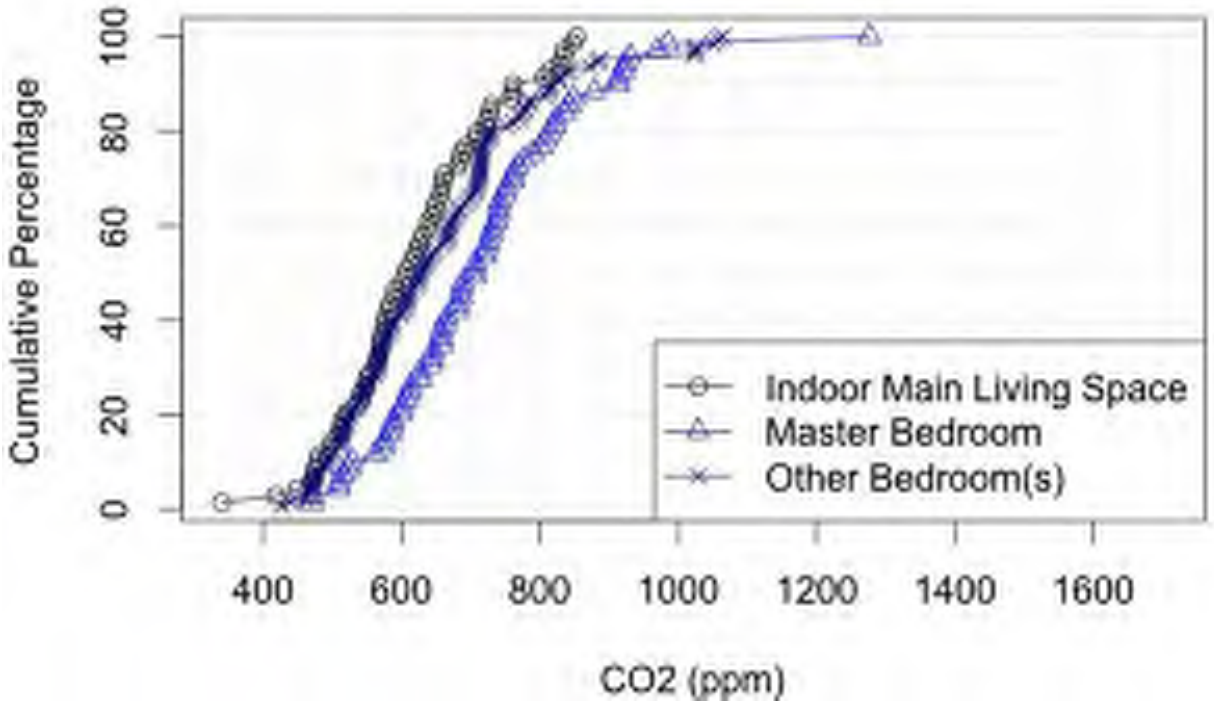

Figure 6: Time-average CO_2 concentrations in indoor main living space and bedrooms.

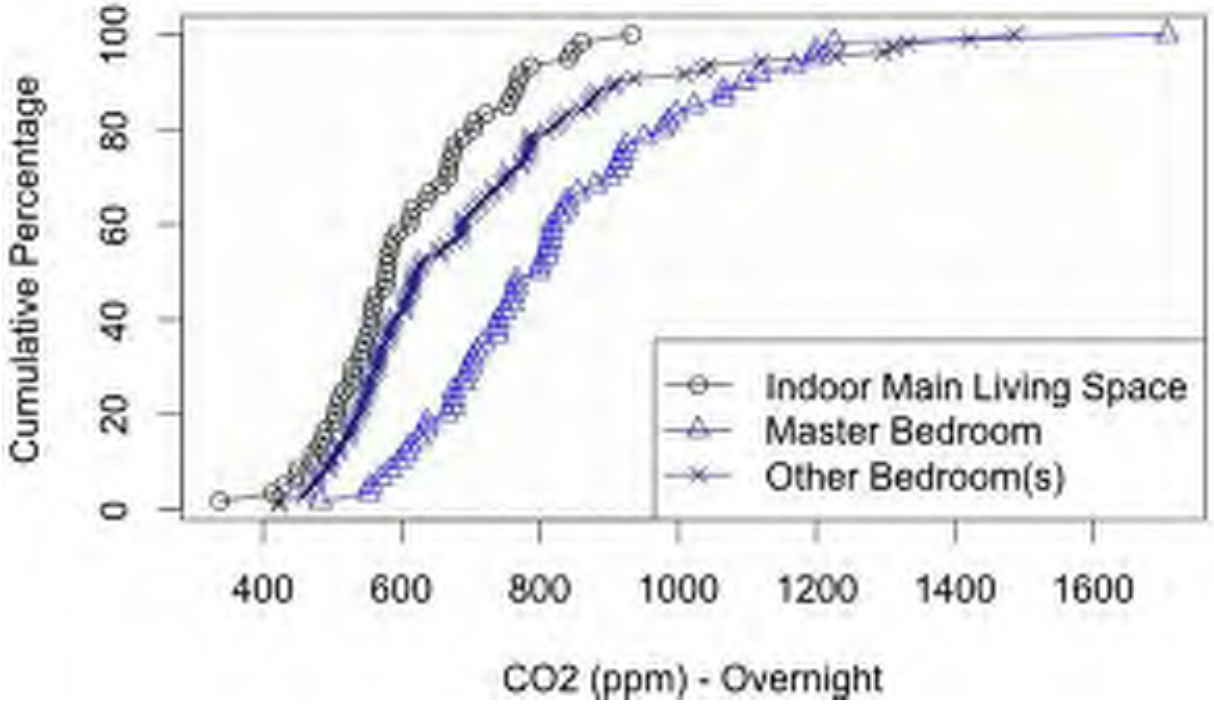

Figure 7: Nighttime (midnight-5am) CO_2 in indoor main living space and bedrooms

5. References

1. Piazza T, Lee R, Sherman M, Price P. *Study of Ventilation Practices and Household Characteristics in New California Homes. Final Report for Energy Commission Contract 500-02-023 and ARB Contract 03-026.* CEC-500-2007-033; Sacramento, CA: California Energy Commission and California Air Resources Board; June 2007, 2007.
2. Offermann FJ. *Ventilation and Indoor Air Quality in New Homes*. CEC-500-2009-085; Sacramento, CA: California Energy Commission and California Air Resources Board; 2009.
3. Lawrence Berkeley National Lab. LBNL. Ventilate Right: Ventilation Guide for New and Existing California Homes. https://homes.lbl.gov/ventilate-right/ashrae-standard-622 Last Accessed:05-Oct-2019-
4. Logue JM, Klepeis NE, Lobscheid AB, Singer BC. Pollutant Exposures from Natural Gas Cooking Burners: A Simulation-Based Assessment for Southern California. *Environ Health Perspect.* 2014;122:43-50.
5. Mullen NA, Li J, Russell ML, Spears M, Less BD, Singer BC. Results of the California Healthy Homes Indoor Air Quality Study of 2011-2013: impact of natural gas appliances on air pollutant concentrations. *Indoor Air.* 2016;26:231-45.
6. Chan WR, Kim Y-S, Less BD, Singer BC, Walker IS. *Ventilation and Indoor Air Quality in New California Homes with Gas Appliances and Mechanical Ventilation*. LBNL-2001200; Berkeley CA: Lawrence Berkeley National Laboratory; 2019.
7. California Air Resources Board. CARB. Composite Wood Products Airborne Toxic Control Measure. www.arb.ca.gov/toxics/compwood/compwood.htm Last Accessed:05-Oct-2019-
8. Chan WR, Kim Y-S, Singer BC, Walker IS, Sherman MH. *Healthy Efficient New Gas Homes (HENGH) Field Study Protocol*. LBNL-1005819; Berkeley, CA: Lawrence Berkeley National Lab; 2016.
9. Walker IS, Wray CP, Dickerhoff DJ, Sherman MH. *Evaluation of flow hood measurements for residential register flows*. LBNL-47382; Berkeley CA: Lawrence Berkeley National Laboratory; 2001.
10. Dacunto PJ, Cheng KC, Acevedo-Bolton V, Jiang RT, Klepeis NE, Repace JL, Ott WR, Hildemann LM. Real-time particle monitor calibration factors and PM2.5 emission factors for multiple indoor sources. *Environmental Science-Processes & Impacts.* 2013;15:1511-1519.
11. Tryner J, Good N, Wilson A, Clark ML, Peel JL, Volckens J. Variation in gravimetric correction factors for nephelometer-derived estimates of personal exposure to PM2.5. *Environ Pollut.* 2019;250:251-261.
12. Singer BC, Delp WW. Response of consumer and research grade indoor air quality monitors to residential sources of fine particles. *Indoor Air.* 2018;28:624-639.
13. Zhang J, Marto JP, Schwab JJ. Exploring the applicability and limitations of selected optical scattering instruments for PM mass measurement. *Atmos. Meas. Tech.* 2018;11:2995-3005.
14. Wang XL, Chancellor G, Evenstad J, Farnsworth JE, Hase A, Olson GM, Sreenath A, Agarwal JK. A Novel Optical Instrument for Estimating Size Segregated Aerosol Mass Concentration in Real Time. *Aerosol Sci Technol.* 2009;43:939-950.
15. Carter EM, Jackson MC, Katz LE, Speitel GE. A coupled sensor-spectrophotometric device for continuous measurement of formaldehyde in indoor environments. *J Exposure Sci Environ Epidemiol.* 2014;24:305-310.

16. Maruo YY, Yamada T, Nakamura J, Izumi K, Uchiyama M. Formaldehyde measurements in residential indoor air using a developed sensor element in the Kanto area of Japan. *Indoor Air.* 2010;20:486-493.

17. Offermann FJ, Hodgson AT. In *Accurancy of Three Types of Formaldehyde Passive Samplers*, Indoor Air 2018, Philadelphia PA, 2018; International Society of Indoor Air Quality Sciences: Philadelphia PA, 2018.

18. Matthews TG, Thompson CV, Wilson DL, Hawthorne AR, Mage D. Air velocities inside domestic environments: An important parameter in the study of indoor air quality and climate. *Environ Int.* 1989;15:545-550.

19. Chan WYR, Joh J, Sherman MH. Analysis of air leakage measurements of US houses. *Energ Buildings.* 2013;66:616-625.

20. Salthammer T, Mentese S, Marutzky R. Formaldehyde in the Indoor Environment. *Chem Rev.* 2010;110:2536-2572.

21. Allen RW, Adar SD, Avol E, Cohen M, Curl CL, Larson T, Liu LJS, Sheppard L, Kaufman JD. Modeling the Residential Infiltration of Outdoor PM2.5 in the Multi-Ethnic Study of Atherosclerosis and Air Pollution (MESA Air). *Environ Health Perspect.* 2012;120:824-830.

22. Wallace LA, Mitchell H, O'Connor GT, Neas L, Lippmann M, Kattan M, Koenig J, Stout JW, Vaughn BJ, Wallace D, Walter M, Adams K, Liu LJS. Particle concentrations in inner-city homes of children with asthma: The effect of smoking, cooking, and outdoor pollution. *Environ Health Perspect.* 2003;111:1265-1272.

23. Allen R, Larson T, Sheppard L, Wallace L, Liu LJS. Use of real-time light scattering data to estimate the contribution of infiltrated and indoor-generated particles to indoor air. *Environ Sci Technol.* 2003;37:3484-3492.

24. Meng QY, Spector D, Colome S, Turpin B. Determinants of indoor and personal exposure to PM2.5 of indoor and outdoor origin during the RIOPA study. *Atmos Environ.* 2009;43:5750-5758.

25. Rodes CE, Lawless PA, Thornburg JW, Williams RW, Croghan CW. DEARS particulate matter relationships for personal, indoor, outdoor, and central site settings for a general population. *Atmos Environ.* 2010;44:1386-1399.

26. Mishra AK, van Ruitenbeek AM, Loomans M, Kort HSM. Window/door opening-mediated bedroom ventilation and its impact on sleep quality of healthy, young adults. *Indoor Air.* 2018;28:339-351.

27. Strom-Tejsen P, Zukowska D, Wargocki P, Wyon DP. The effects of bedroom air quality on sleep and next-day performance. *Indoor Air.* 2016;26:679-686.

28. Wallner P, Munoz U, Tappler P, Wanka A, Kundi M, Shelton JF, Hutter HP. Indoor Environmental Quality in Mechanically Ventilated, Energy-Efficient Buildings vs. Conventional Buildings. *Int J Environ Res Public Health.* 2015;12:14132-14147.

29. Wallner P, Tappler P, Munoz U, Damberger B, Wanka A, Kundi M, Hutter HP. Health and Wellbeing of Occupants in Highly Energy Efficient Buildings: A Field Study. *Int J Environ Res Public Health.* 2017;14.

30. Lajoie P, Aubin D, Gingras V, Daigneault P, Ducharme F, Gauvin D, Fugler D, Leclerc JM, Won D, Courteau M, Gingras S, Heroux ME, Yang W, Schleibinger H. The IVAIRE project - a randomized controlled study of the impact of ventilation on indoor air quality and the respiratory symptoms of asthmatic children in single family homes. *Indoor Air.* 2015;25:582-597.

31. Balvers J, Bogers R, Jongeneel R, van Kamp I, Boerstra A, van Dijken F. Mechanical ventilation in recently built Dutch homes: technical shortcomings, possibilities for improvement, perceived indoor environment and health effects. *Architectural Science Review.* 2012;55:4-14.

32. Laverge J, Delghust M, Janssens A. Carbon Dioxide Concentrations and Humidity Levels Measured in Belgian Standard and Low Energy Dwellings with Common Ventilation Strategies. *International Journal of Ventilation.* 2015;14:165-180.

33. Eklund K, Kunkle R, Banks A, Hales D. *Pacific Northwest Residential Effectiveness Study - FINAL REPORT* NEEA Report #E15-015; Portland, OR: Prepared by Washington State University Energy Program; 2015.

34. Sonne JK, Withers C, Vieira RK. *Investigation of the effectiveness and failure rates of whole-house mechanical ventilation systems in Florida*. FSEC-CR-2002-15; Cocoa, FL: June 1, 2015, 2015.

35. Hult EL, Willem H, Price PN, Hotchi T, Russell ML, Singer BC. Formaldehyde and acetaldehyde exposure mitigation in US residences: in-home measurements of ventilation control and source control. *Indoor Air.* 2015;25:523-535.

36. Frey SE, Destaillats H, Cohn S, Ahrentzen S, Fraser MP. The effects of an energy efficiency retrofit on indoor air quality. *Indoor Air.* 2015;25:210-219.

37. Huangfu YB, Lima NM, O'Keeffe PT, Kirk WM, Lamb BK, Pressley SN, Lin BY, Cook DJ, Walden V, Jobson BT. Diel variation of formaldehyde levels and other VOCs in homes driven by temperature dependent infiltration and emission rates. *Build Environ.* 2019;159.

38. Singer BC, Hodgson AT, Hotchi T, Kim JJ. Passive measurement of nitrogen oxides to assess traffic-related pollutant exposure for the East Bay Children's Respiratory Health Study. *Atmos Environ.* 2004;38:393-403.

SUPPORTING INFORMATION

Indoor Air Quality in California Homes with Code-Required Mechanical Ventilation

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Methods

Recruitment and Screening

Most participants were recruited through postcards mailed to addresses identified on a real estate website (Zillow.com), targeting single-family, detached homes built 2011 or later. Some participants learned of the study via referrals. LBNL attempted to contact all who expressed interest through the study website or by telephone. On contact, participant eligibility was confirmed and participant responsibilities, including keeping windows closed, were described. This process identified 103 eligible and interested candidates and led to monitoring in 72 homes. Most of the other 31 candidates did not respond to three attempts to schedule visits or withdrew before the first scheduled visit. One consented participant withdrew between the first and second visits. Another was excluded when the field team found during the first visit that the home was built before 2011. These participants received a $75 gift card. Two monitored homes did not have compliant ventilation systems and are not included in the data reported herein.

Information Collected for House and Equipment Characterization

- House information: floor area and ceiling heights; number of stories, bedrooms, full and half baths, and other rooms on each floor; attached garage, number of parking spots, etc.
- Whole-house mechanical ventilation system. Noted basic design (exhaust, supply, or balanced); type of control; make, model and rated flow; and fan settings.
- Other ventilation equipment: bath and toilet room exhaust fans, kitchen range hood, and any laundry exhaust fans. Noted make, model and rated flow, type of control for each fan; and for kitchen note if range hood is microwave or simple range hood.
- Heating and cooling system(s). Noted type of system (all were forced air), make and model, capacity (in tons and Btuh) and whether system was zoned. Noted dimensions and location of each return and locations of filter(s) if not at the return air grille. Noted location(s) and types of thermostats. For each filter in a forced air heating or cooling system, recorded make, model and performance rating and visually assessed condition of filter; also took photo. Identified and characterized thermostat and marked location on floor plan.
- Attic. Noted whether it was vented or unvented and the type of insulation. Photographed ductwork, gas furnace, exhaust fans, and vents.
- Gas-burning appliances. Noted make, model and firing rates of all burners or photographed nameplate. Noted locations on floor plans.

Floor plans were generally obtained from builders' websites; otherwise they were sketched on site. Photos were taken of the home exterior, garage, gas appliances, mechanical ventilation equipment, air filters, and any special features.

Specification of Air Quality Monitoring Equipment

Table S1. Specifications of air pollutant monitoring equipment

Parameter	Device make and model	Range and Resolution	Accuracy in Product Literature	Other
Temperature	Onset HOBO UX100-011	Range: -20° to 70°C. Resolution: 0.024°C at 25°C	±0.21°C from 0° to 50°C	Response time: 4 min in air moving 1 m/s Drift: <0.1°C per year
Temperature	Extech SD800	0 to 50°C	±0.8°C	
Relative humidity	Onset HOBO UX100-011	Range: 1% to 95% (non-condensing); Resolution: 0.05%	±2.5% from 10% to 90%; up to ±3.5% at 25°C including hysteresis	Response time: 11 sec to 90% in airflow of 1 m/s Drift: <1% per year typical
Relative humidity	Extech SD800	Range: 10-90%	±4%RH below 70%; 4% of reading + 1% for 70–90% range	
Particulate matter, $PM_{2.5}$	MetOne ES-642 MetOne BT-645	Range: 0-100 mg/m^3. Resolution: 0.001 mg/m^3.	± 5% traceable standard with 0.6um PSL	
Carbon dioxide, CO_2	Extech SD800	Range: 0-4000 ppm; Resolution: 1 ppm	±40 ppm under 1000 ppm; ±5% >1000 ppm[a]	
Nitrogen Dioxide	Aeroqual 500 Series	Range: 0 to 1 ppm	± 0.02 ppm within 0 to 0.2 ppm range	
Formaldehyde	GrayWolf (Shinyei) Multimode Monitor	20 to 1000 ppb	± 4ppb for <40ppb, ± 10% of reading for ≥40ppb	30 min resolution; 20 ppb is lowest reliable value with stated accuracy

[a] Extech monitors did not achieve this performance when compared to a calibrated PPSystems EGM-4 in an injection-decay experiment in a small, room-sized chamber during monitoring as described in the text.

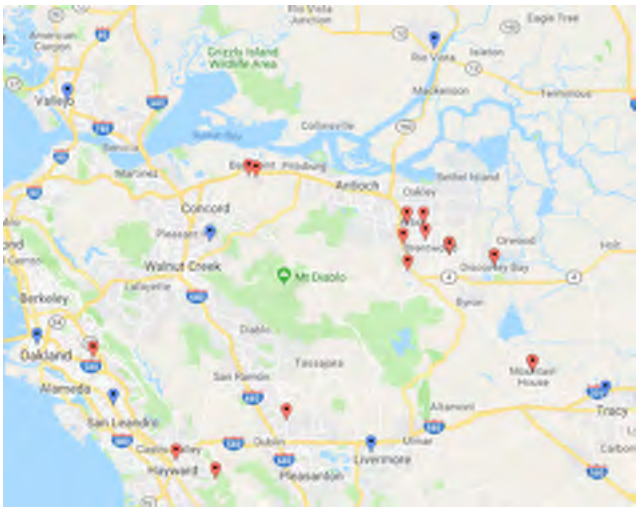
Table S2. Comparison of study design and measurement methods HENGH and CNHS studies of indoor air quality and ventilation in single family detached homes

Parameter	HENGH	CNHS
Number of Homes	70	108
Year Built (Monitoring)	2011-2017 (Jul 2016 – Apr 2018)	2002-2005 (Aug 2006 – March 2007)
Dwelling Unit Mechanical Ventilation (Operational Systems)	All 70 homes had systems that met 2008 or later California code: 64 exhaust; 6 supply.	13 homes had systems that met ASHRAE 62.2-2004: 8 balanced (HRV); 5 with duct connecting FAU to outdoors and controller for ventilation. 9 homes had duct connecting FAU to outdoors but no controller for ventilation.
Gas Cooking Appliances	Cooktops: 100% Ovens 43%	Cooktops: 2% Ovens: 27%
Natural Ventilation	Occupants agreed to not use windows for ventilation.	Occupants asked to use windows as they do normally.
Duration	~7 days	~24 hour
Locations for IAQ parameter measurements	• Living, dining or family room: $PM_{2.5}$, CO_2, NO_X, NO_2, formaldehyde. • Master bedroom: CO_2 and formaldehyde. • Other bedroom(s): CO_2 • Outside: $PM_{2.5}$, NO_X, NO_2, formaldehyde.	• Living, dining or family room: VOCs, CO_2, CO, formaldehyde in all homes; $PM_{2.5}$ in 28 homes; NO_2 in 29 homes. • Outside: formaldehyde at each cluster of 2-3 homes (n=39); $PM_{2.5}$ and NO_2 at 11 clusters.
Air Contaminant Measurement Methods	• Formaldehyde, NO_2, NO_X: time-integrated passive samplers. • Formaldehyde: colorimetric sensor/photometer, 30-min logs • $PM_{2.5}$: Estimated by photometry with indoor adjusted using time-integrated filter samples. • CO_2: Passive, NDIR, 1-min	• Formaldehyde, NO_2, 10 VOCs: time-integrated, pumped samples • $PM_{2.5}$: time-integrated pumped filter samples with size selective inlets and gravimetric analyses. • CO_2: Passive, NDIR, 1-min • CO: Passive, Electrochemical, 1-min

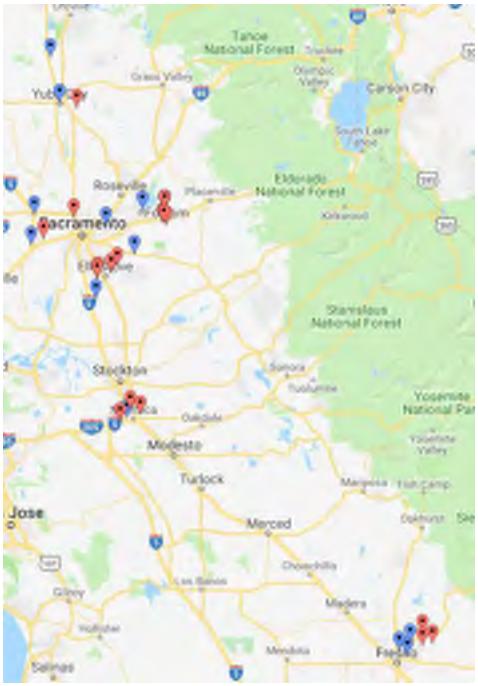
Parameter	HENGH	CNHS
	• T: thermistor sensor • RH: Thin film capacitive sensor	• T: thermistor sensor • RH: Thin film capacitive sensor
Air Contaminant Measurement QA/QC	• Formaldehyde, NO_X, NO_2: duplicates, field blanks, manufacturer's recommended sampling rate. • $PM_{2.5}$: zero at sample start, span adjustment calculated from simultaneous gravimetric samples at 8 indoor locations. • CO_2: baseline and span checks at middle of study. No adjustment of field data. • NO_2: baseline and span checks prior to sampling in most homes. • T and RH sensors used factory calibration with no field calibrations.	• Formaldehyde, $PM_{2.5}$, NO_2, 10 VOCs: duplicates, field blanks, sampling rate measurements at start and stop. • CO_2 and CO: zero and span calibration at start and stop of sampling at each home and corresponding adjustment of field data. • T and RH sensor calibration prior to field session and corresponding adjustment of field data.
Record of natural ventilation use.	Participant affirmed that windows would not be used for ventilation, per study requirements. Loggers on two most-used doors. No loggers or signage on windows. Daily log asked for hours that any windows were opened but not the amount opened.	Occupants instructed to operate windows normally. Loggers on windows that occupants reported to use most frequently, and signage with logs on all windows for occupants to record hours and amount opened.
Method to measure or estimate outdoor air ventilation rate	Estimated from measured mechanical airflows and modeled infiltration with unbalanced ventilation.	Measured with perfluorocarbon tracer (PFT) gas.

Abbreviations: HRV = Heat recovery ventilator; FAU = forced air unit; NDIR = non-disperse infrared.

Locations of Ambient Air Quality Monitoring Stations Used to Estimate Outdoor $PM_{2.5}$



← San Francisco Bay Area



← Sacramento and Central Valley

Southern California ↓

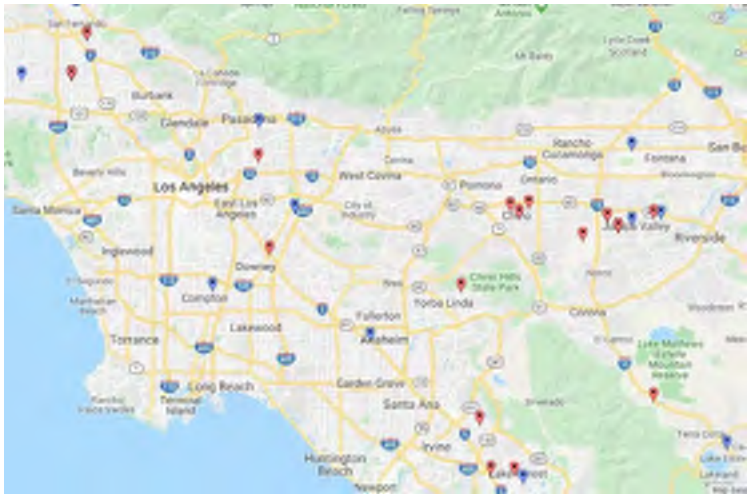


Figure S1: Locations of PM2.5 air monitoring stations (blue) in relation to study homes (red).

Quality Assurance Procedures for Air Quality Monitors

The indoor and outdoor $PM_{2.5}$ monitors were co-located for roughly one hour during the instrument deployment visit at each home. In most cases the co-location was outdoors at the location of the outdoor monitor. Co-located comparisons were available from 45 homes. In two of the homes, the two monitors measured very different concentrations likely because the outdoor monitor had a heated inlet that was set to activate when relative humidity reached above 60%, and the indoor monitor did not. The heated inlet prevents condensation that could damage the instrument. The indoor monitor did not have a heated inlet because high humidity is generally not a concern when sampling indoors. At the two homes during the one-hour co-location test, the outdoor monitor measured high concentration of $PM_{2.5}$ (51 and 60 $\mu g/m^3$ at Home 063 and 068, respectively). Without the heated inlet, the co-located indoor monitor measured 111 and 78 $\mu g/m^3$, respectively. The two homes were sampled in winter (January 2018) in Tracy and Manteca CA, where high humidity condition in the morning likely explained this difference between the co-located indoor and outdoor $PM_{2.5}$ monitors. Excluding these two cases, the co-located indoor and outdoor $PM_{2.5}$ monitors agreed to within 1.9 $\mu g/m^3$ on average (median = 0.9 $\mu g/m^3$), with the outdoor monitor reporting lower concentrations than the indoor monitor in 79% of the indoor side-by-side deployments. This is likely because the heated inlet intended to prevent condensation resulted in some volatilization of organics in the outdoor particles. The results of the brief side-by-side deployment of indoor and outdoor MetOne photometers at each home are provided in Figure S2**.**

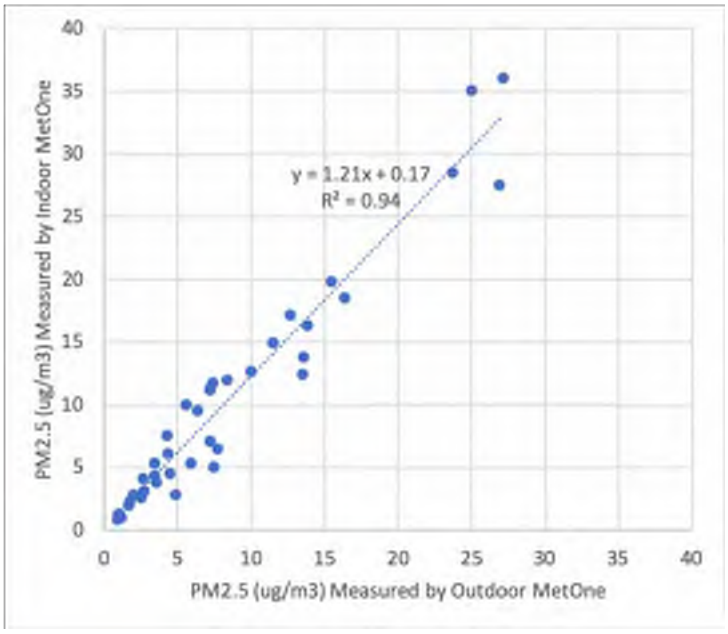


Figure S2. Results of side-by-side deployment of indoor and outdoor MetOne photometers at each house, typically outdoors.

The Extech CO_2 monitors were co-located for 1 hour at each home or at a warehouse where the field team prepared equipment before a visit. The field team confirmed that CO_2 monitors agreed with one another to within a range of 100 ppm. Extech monitors were also calibrated at LBNL during two breaks in sampling, with 5 units checked during Feb 2017 and 7 units (including two from first round) checked during Dec 2017. On each occasion, the monitors were set up in a well-mixed room along with an EGM-4 gas analyzer (PP systems, Amesbury, MA, USA). The EGM-4 was separately calibrated using standard gas of known CO_2 concentrations between 0 and 2500 ppm. During each event, CO_2 concentrations in the chamber were raised by injection of pure CO_2 then left to decay with air exchange. Hourly concentrations were calculated for each monitor. The first-hour means were 1056 and 1537 ppm for the two events. Decay periods were 26 and 7 hours to final-hour concentrations of 420 and 529 ppm. Hourly average concentrations reported by the Extech units differed (high to low range) by 71–86 ppm during the first spike-decay and 111–168 ppm during the second. Averaged over the full spike-decay intervals, differences between Extech units and the EGM-4 ranged from -20 ppm to 84 ppm.

The Aeroqual 500 NO_2 monitor was calibrated before each visit with zero gas and a 1 ppm NO_2 standard gas. Monitor response was adjusted to match those values following manufacturer instructions. Despite this calibration step, there was generally a substantial, positive offset in the time-integrated NO_2 concentration measured by the Aeroqual when compared with the concentrations measured using the passive sampler. Further processing of the Aeroqual NO_2 data is required, which is beyond the scope of this paper.

Weighing of Filters for Gravimetric $PM_{2.5}$ Determination

Gravimetric samples were collected on 37 mm diameter, 2.0 micron pore size, Pall Teflo filters with ring. Prior to deployment, filters were preconditioned for 24 hours at controlled temperature and humidity conditions (47.5 +/- 1.5 % RH and 19.5±0.5 ºC), passed over a deionizing source to remove static charge and weighed twice using a Sartorius SE2-F balance. Pre-weighed filters were loaded into the pDR-1500 photometers and were shipped to GTI for deployment. After a week of monitoring, GTI shipped the pDR monitors back to LBNL. LBNL removed the filters, and repeated the preconditioning and weighing procedures. The collected mass was determined as the post-sampling versus pre-sampling mass difference. The field blank was subtracted from the sample mass. Sampled air volume was taken from the pDR. Mass concentration was calculated as collected PM mass / sample air volume. The sample flow rate of the pDR was checked in the lab before and after each field use.

Passive Sampler Procedures and Quality Assurance

Ogawa samplers were prepared according to manufacturer protocols. Prior to assembly for field deployment, all parts of the samplers were washed thoroughly with deionized water and allowed to dry thoroughly in a laboratory at LBNL. Sample pads were stored in the refrigerator in their original packaging until they were inserted into samplers. After samplers were assembled with new sample pads, they were placed in sealed amber plastic bags (Ziploc) and shipped to the field team in an insulated box with ice packs to keep them cool.

All passive samplers were shipped to LBNL for analysis. To avoid damage to the chemical samplers from extreme temperatures, samplers were mailed in an insulated shipping container

with ice packs to keep them cool. The samples were extracted and analyzed following the protocols provided by each company (Ogawa & Company 2017; SKC, Inc. 2017). All Ogawa samples were extracted for analysis within 30 days from when the samplers were assembled.

For each NO_X and NO_2 sample we subtracted the mass determined from the field blank at the same home before calculating the sample period concentrations of NO_X, NO_2 and NO as the difference between the adjusted NO_X and NO_2 concentrations. For two homes that did not have a field blank, we subtracted 0.15 micrograms for NO_2 and 0.22 micrograms for NOx, which are the mean mass determined from all available field blanks; these masses correspond to 0.9 ppb of NO_2 and 1.3 ppb of NOx for a 7-day collection period. Following blank subtraction, 4 indoor and 5 outdoor NO_2 samples and 1 indoor and 6 outdoor NO_x samples had negative concentrations; the occurrence of negative values results from variability in the blank correction and low sample masses. These negative NO_2 and NO_x concentrations were retained when calculating summary statistics. Analysis of 64-paired duplicates of indoor samples found that agreement in NO_2 concentrations was within 0.6 ppb on average (median = 0.3 ppb). When available, duplicates were averaged to provide a better estimate of the indoor concentrations of NO, NO_2, and NOx. Sampling rates were calculated using co-located temperature and relative humidity measurements following manufacturer instructions.

The formaldehyde concentration determined by passive sampler at each home also was adjusted by the effective sample period concentration determined from the field blank at the same home. For the eleven homes that did not have a formaldehyde passive sample field blank, we subtracted 0.15 micrograms, which is the mean mass determined from all available field blanks (and corresponds to 0.6 ppb for a 7-day collection period). Sixty-six paired indoor formaldehyde samples agreed to within 1.0 ppb on average (median = 0.7 ppb). When available, duplicates were averaged to provide a better estimate of the indoor concentrations. A sampling rate of 20.4 ml/min were used following manufacturer instructions.

The UMEx contains an internal blank within each sampler that can potentially be used for convenience instead of deploying a separate field blank sampler. However, analysis of the internal blank suggested that even though it was not directly exposed to the sampling air, some formaldehyde was collected, possibly because the compartment isolating the internal blank was not completely airtight. The average analyte mass determined from internal blanks of indoor samples was 0.6 micrograms; this is 4 times the field blank value noted above.

Formaldehyde indoor emission rates E ($\mu g/m^3$-h) were calculated using a simple mass-balance equation assuming well-mixed, steady state condition. The same method was applied by Offermann (2009) to estimate indoor emission rates of formaldehyde and other VOCs.

$$E = (C_i - C_o) \times AER \quad (1)$$

Outdoor formaldehyde concentration (C_o, $\mu g/m^3$) was subtracted from the indoor concentration (C_i, $\mu g/m^3$) measured at the central location, assuming that there is no loss in formaldehyde as the outdoor air enters through the building envelope. Air exchange rate (AER, 1/h) is assumed to be the only mechanism that removals formaldehyde from the indoor air. Air exchange rate was estimated from natural infiltration airflow and mechanical airflow using sub-additivity, as described later in the Methods.

Potential Impact of Low Air Speeds on Passive Sampler Data

The sampling rates of passive samplers may be impacted by low air speeds at the sampler inlet, as discussed by Offermann and Hodgson (2018)[1] and papers cited therein. At very low air speeds, diffusive uptake to the passive sampler causes a reduction in analyte concentration at the face of the air sampler relative to the surrounding indoor air, resulting in an effective increase in the diffusive path length and lower sampling rate.

Since air speeds were not measured in HENGH homes, we rely on the data of Mathews et.al. (1989)[2] to assess the potential for low air speeds to bias the passive sampler measurements in residences. Matthews et al. used a TSI Model 1620 omnidirectional anemometer to measure air speeds during daytime hours in various rooms of six occupied homes and in an unoccupied research house. The overall median air speed measured in the six occupied homes was 318 cm/min. HVAC operation was found to substantially impact air speeds, by a factor of 5 in one house and by roughly a factor of 2 in two other occupied houses. The median measured air speeds with HVAC off in three occupied homes and the research house were 90, 198, 342, and 246 cm/min. Among the rooms studied, air speeds were lowest in the master bedroom, with median values during no HVAC use of 108 cm/min across the three occupied houses. The condition with the lowest measured air speeds was in a bedroom that was completely unoccupied; during HVAC off times median air speeds were 66 cm/min. HVAC operation was not tracked in HENGH; but the median HVAC run time was 1.1 h per 24 h in the CNHS.

Using a TSI Model 8475 omnidirectional anemometer, Offermann and Hodson reported an air speed of 27 cm/min in an unoccupied office overnight with no HVAC operation.

Using the data above as reference points, Offermann provided the following correction factors for the geometries of the UMEx and Ogawa samplers at selected air speeds.

Air Speed (cm/min)	UMEx CF	Ogawa CF
27	1.21	1.16
66	1.09	1.07
100	1.06	1.04
300	1.02	1.01

Using the daytime airspeeds measured with no HVAC operation and assuming that condition applied roughly half the time in HENGH master bedrooms, and also assuming higher airspeeds with occupancy during nighttime hours, the bias from low air speeds would be on the order of 3% for formaldehyde and 2% for NO_X and NO_2. A bedroom that is completely unoccupied during the daytime and similar to the one reported in Matthews could have a bias of 4-5% for formaldehyde and 3-4% for NO_X and NO_2. If any rooms commonly experienced conditions similar to those observed overnight in the Offermann office, the bias would be 8-10%.

[1] Offermann, F. J. and A. T. Hodgson (2018). Accurancy of Three Types of Formaldehyde Passive Samplers. Indoor Air 2018, Philadelphia PA, International Society of Indoor Air Quality Sciences.

[2] Matthews, T. G., C. V. Thompson, D. L. Wilson, A. R. Hawthorne and D. Mage (1989). "Air velocities inside domestic environments: An important parameter in the study of indoor air quality and climate." Environment International **15**: 545-550.

Adjustments to Formaldehyde Data from FM-801 Monitor

Output of the FM-801 formaldehyde monitor dropped precipitously during events of substantial gas cooking burner use, presumably owing to an NO_2 interference as described by Maruo et al.[3] FM-801data that were clearly affected by cooking were identified by visual review, considering data from the time-resolved NO_2 monitor and the cooktop and oven temperature sensors, and removed. Data marked as "<LOD" because they were below the 10 ppb quantitation limit were assigned a value of 7.3 ppb based on analysis of data from homes with the modified FM-801software that provided numerical results below 10 ppb.

Calculation of Outdoor Air Exchange Rate

First, mechanical fan flows were calculated by summing exhaust fan flows (whole house exhaust fan, and other fans in bathroom, range hood, clothes dryer) weighted by their average usage time. Since it was not practical to directly measure the airflow of the clothes dryers in most homes, we assumed dryer airflow of 125 cfm based on a recent report[4].

Airflows from mechanical fans were added to calculate balanced ($Q_{balance_mech}$) and unbalanced ($Q_{unbalance_mech}$) airflows by comparing minute by minute the amount of exhaust and supply air from usage data collected from each home. Next, air infiltration ($Q_{infiltration}$) was calculated using the flow coefficients and pressure exponents from average of pressurization and depressurization tests of building envelope leakage, determined as part of the DeltaQ Test, and using stack and wind coefficients following the ASHRAE Fundamentals Enhanced Model. Wind data were obtained from the nearest weather station[5]. Indoor and outdoor temperatures were monitored onsite. Photos of the house and surroundings were reviewed to determine the appropriate shelter class: either 4 (urban building on larger lots where sheltering obstacles are *more than* one building height away) or 5 (shelter produced by buildings or other structures that are *closer than* one house height away). The total ventilation rate was calculated following Equation 2, which uses a superposition adjustment (Ø) to account for the sub-additivity of unbalanced mechanical airflows with air infiltration.

$$Q_{total} = Q_{balance_mech} + Q_{unbalance_mech} + \emptyset Q_{infiltraiton} \quad (1)$$

$$\emptyset = \frac{Q_{infiltration}}{Q_{unbalance_mech} + Q_{infiltration}} \quad (2)$$

Field teams measured ceiling heights in the great room, kitchen, living room, dining room, bedrooms, and other parts of the house. Air exchange rate was computed using an approximate house-averaged ceiling height and floor area recorded by the field team.

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[3] Maruo, Y. Y., T. Yamada, J. Nakamura, K. Izumi and M. Uchiyama (2010). "Formaldehyde measurements in residential indoor air using a developed sensor element in the Kanto area of Japan." Indoor Air **20**(6): 486-493.

[1] ENERGY STAR reports rated fan flow of clothes dryer typically range between 100 and 150 cfm. https://www.energystar.gov/sites/default/files/asset/document/ENERGY_STAR_Scoping_Report_Residential_Clothes_Dryers.pdf

[5] Data obtained from www.wunderground.com. During periods when wind was reported as "calm", 1 mph (mile per hour) was assumed for calculating air infiltration rate.

Estimate of Potential Bias in Calculated Air Infiltration

While the ASHRAE Enhanced Model was developed from an extensive set of measured data and has been evaluated in several previous studies[6,7,8], it is nevertheless valuable to consider that it could have varied performance in specific applications.

For this study, we used data from the CNHS – which measured time-integrated outdoor air ventilation rates using perfluorocarbon tracer gases (PFTs) – to evaluate the method used to calculate the infiltration portion of air exchange in HENGH, which measured mechanical airflows but calculated infiltration and overall AER.

The analysis looked at 13 CNHS homes that that had no window opening and no continuous mechanical ventilation (just occasional bathroom, kitchen, and clothes dryer exhausts); the overall AERs in these homes were thus dominated by infiltration. For these 13 homes, we calculated infiltration/air exchange in the same manner as was done for the HENGH study. (The only difference was that the calculation was done with 1-minute indoor temperature and intermittent exhaust fan data for HENGH and 15-minute data for CNHS. The calculations used the following parameters:

- default stack and wind coefficients for n=0.67;
- on-site data for indoor air temperature and local Meteorological Station data for outdoor air temperatures and wind speeds;
- setting all 0 mph wind speeds to 1 mph;
- using the interpolated ASHRAE Fundamentals Shelter Factors;
- combining any intermittent mechanical airflow with infiltration using sub-additivity;
- calculating the weekly integrated AER as the harmonic mean of 15-min estimates.

For each of the 13 CNHS homes, we compared the AER measured by PFT to the calculated AER to determine a correction factor, which we consider to be applicable to the calculated infiltration portion of AER. The median correction factor for the 13 homes was 1.81 with a range of 1.04 – 2.11. While this is high compared to published comparisons of measurements to infiltration model calculations, our hypothesis is that it is mostly due to the difficulty in selecting appropriate wind shelter factors.

Since most of the HENGH homes had continuous mechanical exhaust systems, infiltration accounted for only a fraction of the total outdoor air exchange. To assess the potential impact of infiltration bias calculated for the CNHS homes on the AERs calculated for HENGH homes, we

[6] Walker, I.S. and Wilson, D.J., (1998), "Field Validation of Equations for Stack and Wind Driven Air Infiltration Calculations", ASHRAE HVAC&R Research Journal, Vol. 4, No. 2, pp. 119-140. April 1998. ASHRAE, Atlanta, GA. LBNL 42361.

[7] Francisco, P. and Palmiter, L. (1996). "Modeled and Measured Infiltration in Ten Single-Family Homes. Proc. ACEEE 1996.

[8] Wang, W., Beausoleil-Morrison, I. and Readon, J. 2008. Evaluation of the Alberta Air Infiltration Model Using Measurements and Inter-Model Comparisons. Building and Environment, 44. 309-318. doi:10.1016/j.buildenv.2008.03.005c

adjusted the calculated infiltration rates for all HENGH homes by a factor of 1.81, then used sub-additivity to combine the adjusted infiltration rates with the measured mechanical ventilation rates on a home-by-home basis. The median calculated adjustment factor for the total ventilation rates for HENGH homes is 1.18.

In addition to the potential bias from infiltration calculations, the calculated AERs for HENGH homes are also biased in some cases because the calculation assumed no window or door opening; any substantial use of windows or doors for ventilation would further raise AERs relative to calculated values.

Results

House Characteristics

Table S3. Sampled Homes by Cities and Climate Zones (N=70)

Gas Utility Service	Cal. Climate Zone	Cities (Number of Homes)	Homes	Total
PG&E	3	Discovery Bay (2), Hayward (2), Oakland (1)	5	48
	11	Marysville (1)	1	
	12	Brentwood (12), El Dorado Hills (10), Elk Grove (6), Manteca (4), Mountain House (2), Pittsburg (2), Davis (1), Dublin (1), Sacramento (1)	39	
	13	Clovis (3)	3	
SoCalGas	8	Irvine (2), Downey (1), Lake Forest (1), Yorba Linda (1)	5	22
	9	Van Nuys (5), Alhambra (1)	6	
	10	Jurupa Valley (5), Chino (4), Corona (1), Eastvale (1)	11	

Table S4. Sampled Homes by Seasons

Season	Months	Number of Homes
Winter	Dec-Feb	16
Spring	Mar-May	13
Summer	Jun-Sep	27
Fall	Oct-Nov	14
Total		70

Table S5. Sampled Homes by Year Built

Year Built	Number of Homes
2011	1
2012	7
2013	13
2014	17
2015	15
2016	14
2017	3
Total	70

Table S6. Age of Homes When Sampled[1]

HENGH Age When Sampled (years)	HENGH Number of Homes at Age	CNHS Percentile	CNHS Age When Sampled (years)
<1	2	Min	1.7
1	14	10th	2.4
2	32	25th	3.0
3	14	50th	3.4
4	4	75th	4.0
5	2	90th	4.3
No Response	2	Max	5.5
Total	N=70	N=108	

[1] CNHS data from Table 15 of Offermann et al. (2009)

Table S7: Sampled Homes by Floor Area

Floor Area (ft^2)	Homes	Floor Area (m^2)	Homes
<1500	5	<150	9
1500–1999	11	150–199	12
2000–2499	16	20–-249	15
2500–2999	16	250–299	22
3000–3499	14	300–349	6
≥3500	8	≥3500	6
Total	70	Total	70

Table S8: Sampled Homes by Number of Stories

Stories	Number of Homes
1	27
2	42
2.5	1
Total	70

Table S9: Sampled Homes by Number of Bedrooms

Bedrooms	Number of Homes
1	1
2	3
3	20
4	28
5	17
6	1
Total	70

Table S10: Sampled Homes by Number of Bathrooms

Bathrooms	Number of Homes
1–1.5	1
2–2.5	24
3–3.5	35
4–4.5	9
5–5.5	1
Total	70

Table S11: Locations of Gas Fireplaces

Location	Homes
Great room or living room	26
California room	3
Courtyard	1
Patio	2
No gas fireplace	38
Total	70

Household Demographics

HENGH homes are compared with data from American Housing Survey (2017 AHS). Data from the Public Use File (PUF)[9] were used to compare with demographic data of HENGH homes. The PUF provided data for four California metropolitan areas that were surveyed in 2017: Los Angeles-Long Beach-Anaheim, San Francisco-Oakland-Hayward, Riverside-San Bernardino-Ontario, and San Jose-Sunnyvale-Santa Clara. The first three of the four metropolitan areas were included in the national survey, and the last one was included in the metropolitan survey. Data from owner-occupied, single-family detached homes built after 2010 were selected from the 2017 AHS data for comparison with HENGH homes in the tables below.

Table S12: Number of Occupants in Sampled Homes

Number of Occupants	Number of Homes in HENGH	% Homes in HENGH	% Homes in 2017 AHS
1	3	4%	13%
2	29	43%	28%
3	10	15%	18%
4	13	19%	24%
5	6	9%	9%
6	3	4%	5%
7 or more	3	4%	2%
No response	3	--	--
Total	70	100%	100%

[9] https://www.census.gov/programs-surveys/ahs/data/2017/ahs-2017-public-use-file--puf-.html

Table S13: Number of Occupants in Sampled Homes by Age Group

Number of Occupants Within Age Group	Homes with Designated Number of Occupants in Designated Age Group								
	Number of HENGH			% HENGH Homes			% Homes in 2017 AHS		
	Age 0–17	Age 18–65	Age 65+	Age 0–17	Age 18–65	Age 65+	Age 0–17	Age 18–65	Age 65+
0	41	8	49	60%	12%	72%	59%	12%	74%
1	7	7	10	10%	10%	15%	19%	17%	14%
2	14	41	9	21%	60%	13%	18%	42%	11%
3	3	8	0	4%	12%	0%	4%	15%	0%
4	2	2	0	3%	3%	0%	0%	9%	0%
5 or more	1	2	0	1%	3%	0%	0%	5%	0%
No response	2	2	2	--	--	--	--	--	--
Total	70	70	70	100%	100%	100%	100%	100%	100%

Table S14: Total Household Income in Sampled Homes

Income Range	Number of Homes in HENGH	% Homes in HENGH	% Homes in 2017 AHS
$35,000–$49,999	1	2%	18%
$50,000–$74,999	2	3%	12%
$75,000–$99,999	5	8%	10%
$100,000–$150,000	29	44%	20%
Greater than $150,000	29	44%	40%
No response	4	--	--
Total	70	100%	100%

Table S15: Education Level of Head of Household in Sampled Homes

Education Level	Number of Homes in HENGH	% Homes in HENGH	% Homes in 2017 AHS
No diploma	0	0%	6%
Completed high school	1	1%	16%
Some college	5	7%	15%
Associate's degree	2	3%	7%
College degree	23	34%	30%
Graduate or professional degree	36	54%	26%
No response	3	--	--
Total	70	100%	100%

Air Tightness

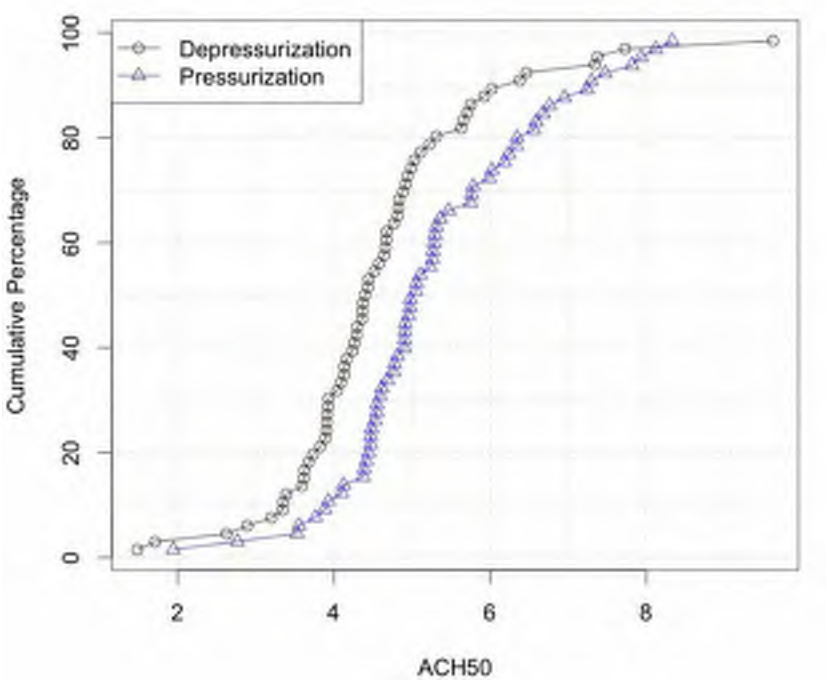


Figure S3: Distribution of ACH50 from Envelope Leakage Measurements

Ventilation and Filtration Equipment

Table S16: Whole House Ventilation System Type

System Type	Operation Mode	Fan Location(s)	Number of Homes
Exhaust	Continuous	Laundry Room	43
		Bathroom	9
		Attic	3
	Intermittent	Laundry Room	5
		Bathrooms (multiple)	4
Supply	Continuous	Attic	4
	Intermittent	None*	2
Total			70

*These central fan integrated supply (CFIS) systems had a duct with motorized damper that connected the outdoors to the return side of the forced air system, but no supply fan.

Table S17: Whole House Ventilation System Control

Whole-House Ventilation Control	Controller Labelled?	% On As-Found
On/Off Switch	No (N=42)	5%
	Yes (N=12)	58%
Programmable Controller	No (N=10)	50%
Thermostat	No (N=2)	0%
Breaker Panel	No (N=1)	100%
No Controller	No (N=3)	100%

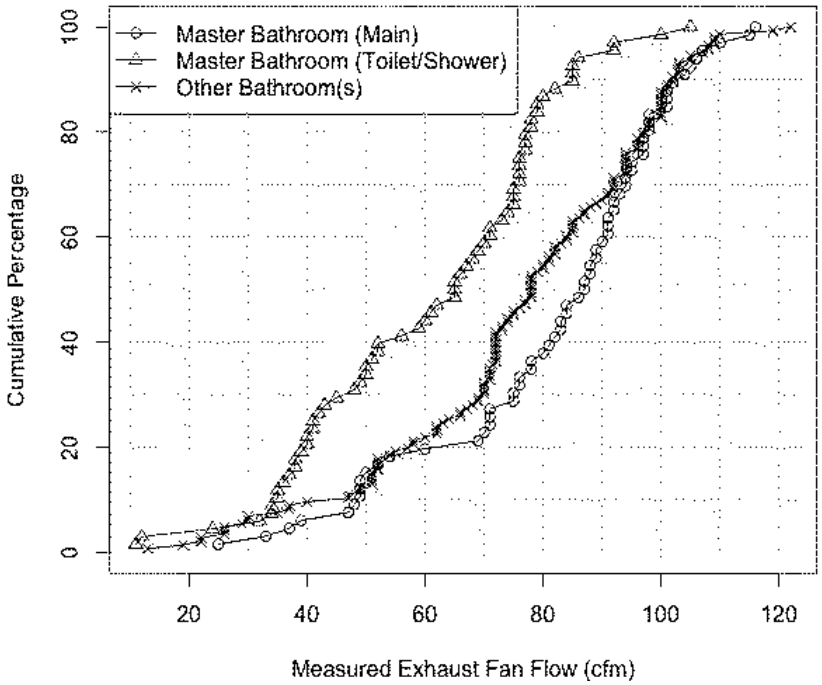


Figure S4: Bathroom Exhaust Fan Measured Flow Rates

Table S18: Air Filter MERV Ratings

MERV	Number of Air Filters
6	2
7	2
8	57
10	17
11	22
12	1
13	9
14	1
Total	111

Table S19: Time Since Last Air Filter Change

Marked or Estimated Time	Number of Air Filters
0 to 2 Months	33
3 to 5 Months	16
6 to 8 Months	17
12 to 15 Months	8
Never Changed	11
Total	85

Table S20: Condition of Air Filters Observed by Field Team

Air Filter Condition	Number of Homes	Number of Air Filters
Clean or Like New	20	39
Used or Dirty	29	65
Very Dirty	18	24
Total	67*	128

* Total excludes one home (113) without a central forced air system (this home had a minisplit heat pump with no filter for air quality), one home (127) without any air filters installed in the return air registers, and one home (117) for which field observations were missing.

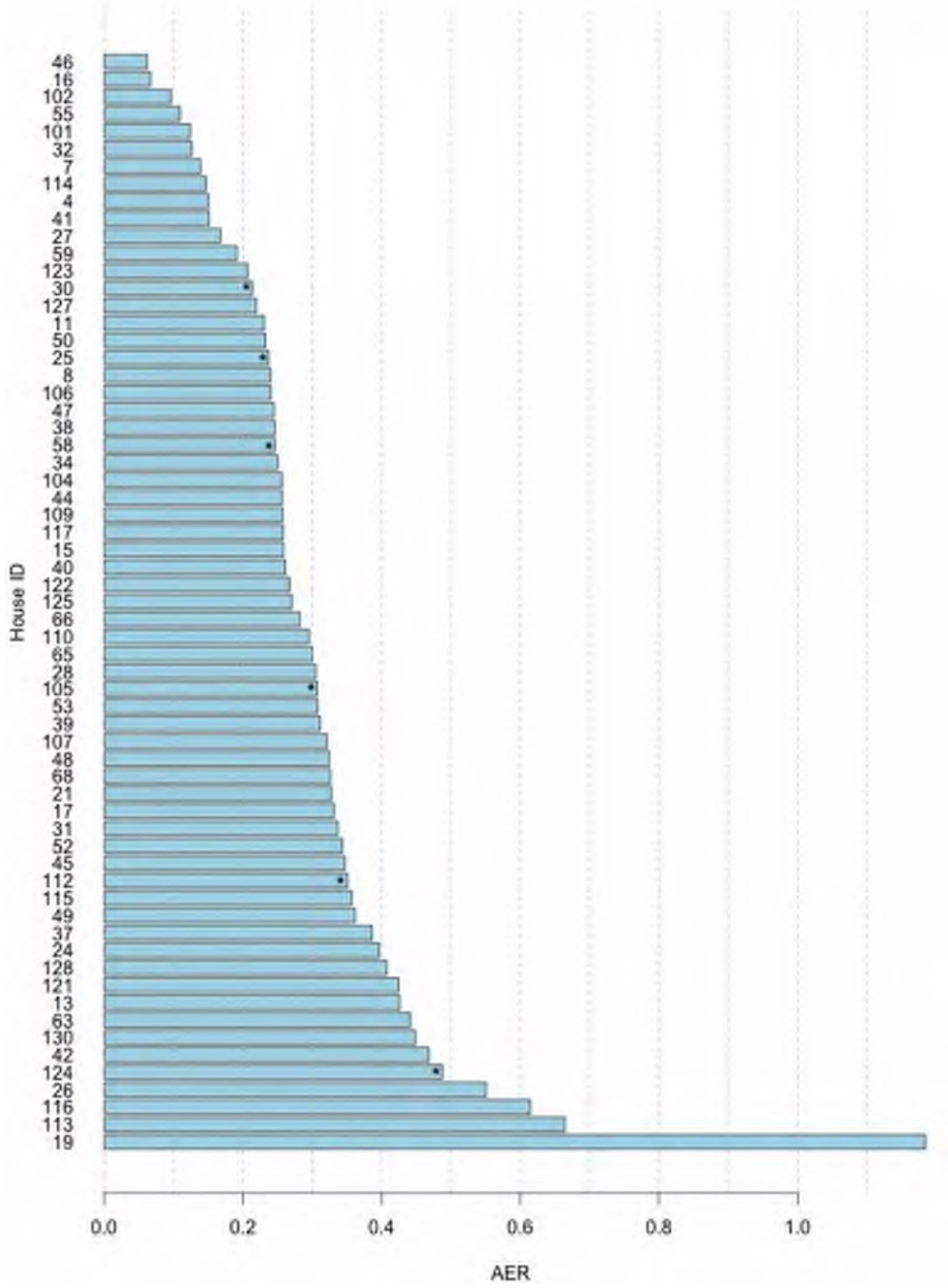


Figure S5: Total Estimated Air Exchange Rate

This plot includes estimates for 63 homes. It excludes four homes that used supply ventilation because the mechanical airflow could not be determined. The plot also excludes three homes with missing DeltaQ test result because building envelope airtightness is required to calculate air infiltration (part of total ventilation). There are six homes (*) where opening of the house-to-patio and/or garage door(s) for more than 3 hours per day on average may have increased the overall AER substantially.

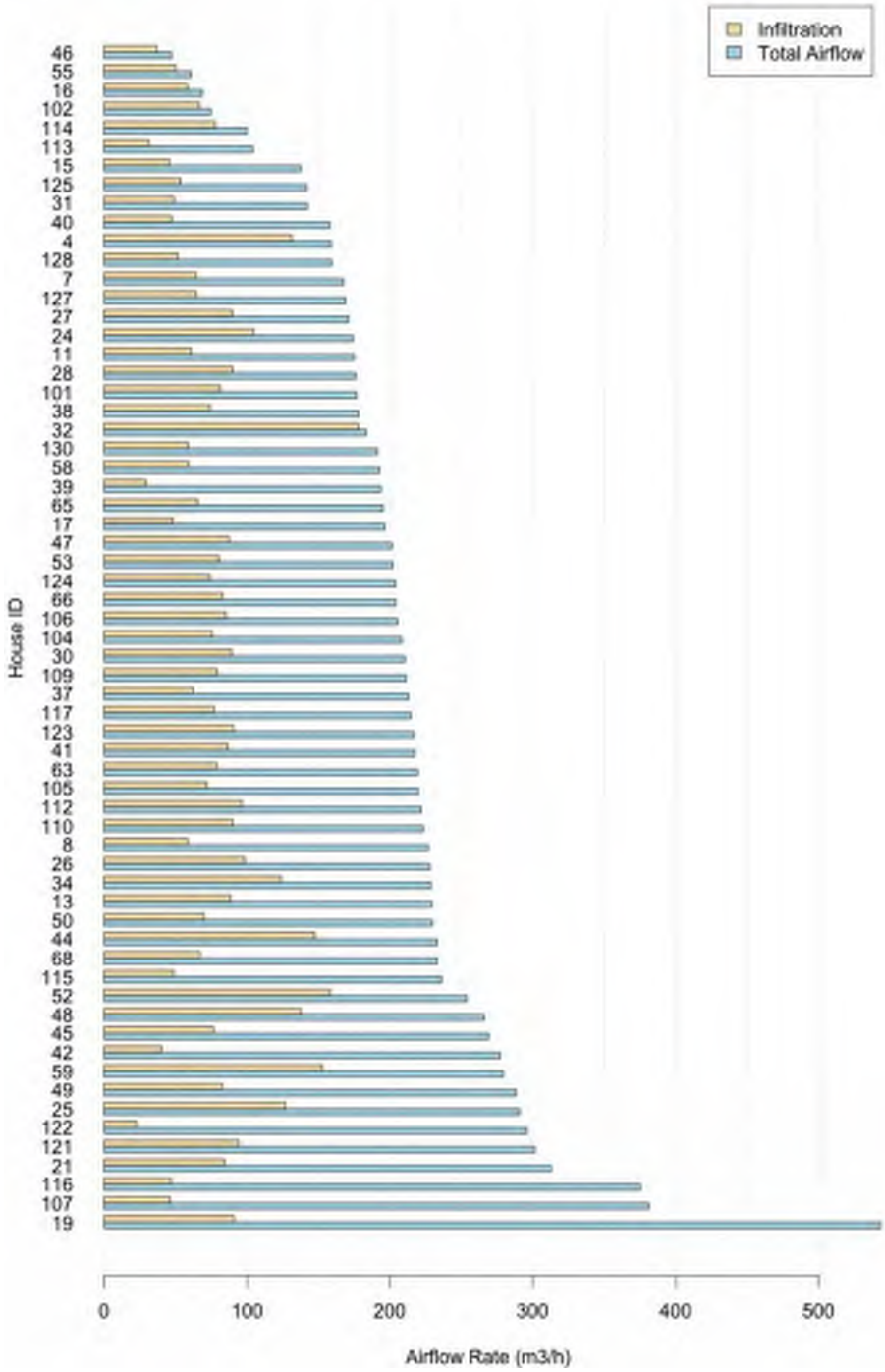


Figure S6: Infiltration and Total Airflow (Mechanical + Infiltration)

Mechanical airflow rates were calculated by summing all exhaust fans in a home. The estimated total outdoor airflow rates include both mechanical airflow and air infiltration. Data are plotted for 63 homes same as in Figure S5.

General Occupancy and Sources – From Survey

Table S21: How Frequently Are Candles Used in the Home

	Number of Homes
Never	13
A few times a year	23
A few times a month	16
A few times a week	11
Every day	5
No response	2
Total	70

Table S22: Number of Furry Pets in Homes

Number of Pets	Number of Homes
0	20
1	17
2	12
3	3
4 or more	2
No response	16
Total	70

Occupancy and Sources During Week of Monitoring

Table S23: Self-Reported Average Occupancy (Number of People) When Home Was Occupied

Average Occupancy	Number of Homes	Average Occupancy	Number of Homes
1 to <2 People	23	5 to <6 People	4
2 to <3 People	20	6 to <7 People	3
3 to <4 People	14	No Response	2
4 to <5 People	4	Total	70

Table S24: Self-Reported Average Occupied Hours per Day During Monitoring Week

Number of Occupied Hours	Number of Homes
> 23 Hours	16
20 to <23 Hours	27
16 to <20 Hours	17
12 to <16 Hours	3
6 to <12 Hours	3
< 6 Hours	2
No Response	2
Total	70

Table S25: Self-Reported Cooktop Use (Number of Times) During Monitoring Week

Number of Cooktop Use	Number of Homes
None	2
1–3 Times	16
4–6 Times	16
7–14 Times	26
15–21 Times	6
More than 21 Times	2
No Response	2
Total	70

Table S26: Self-Reported Oven and Outdoor Grill Use During Monitoring Week

	Number of Homes	
Number of Uses	Oven	Outdoor Grill
None	16	52
1 Time	14	9
2–3 Times	21	7
4–5 Times	11	0
6–8 Times	6	0
No Response	2	2
Total	70	70

Table S27: Average Cooking Activity Duration During One-Week Monitoring, Self-Reported

	Number of Homes		
Use Duration	**Cooktop**	**Oven**	**Outdoor Grill**
Less than 10 Minutes	3	3	0
10–30 Minutes	40	20	5
30–60 Minutes	20	24	8
>60 Minutes	3	5	3
No Usage Reported	2	16	52
No Response	2	2	2
Total	70	70	70

Table S28. CNHS Activities (Table 42 and 43 of Offermann et al. 2009):

- Toasting: n=50, median of 5 min
- Frying or sautéing: n=36, median of 17 min
- Baking: n=33, median of 45 min
- Broiling: n=11, median of 19 min
- Other cooktop: warming/boiling, n=47, median of 20 min
- Vacuuming: n=16, median of 25 min
- Sweeping or dusting: n=16, median of 12 min
- Candle burning, n=4 events, median of 165 min.
- Aerosol air fresheners or personal care products: n=30
- Large party or dinner gathering: n=3
- Other activities: dust, smoke or fumes: n=3, median 30 min

Air Pollutant Concentrations: Formaldehyde

Table S29 presents a comparison of formaldehyde measurements made at the main indoor site with the UMEx-100 time-integrated sampler and the weeklong average of the half-hourly resolved data obtained with the FM-801 monitor. Statistical significance tests suggest no difference in formaldehyde concentrations measured using the two methods: p-value = 0.09 (Student's paired t-test).

Table S29: Comparison of Time-Integrated Formaldehyde Measured with Two Methods

	SKC UMEx-100 Passive Sampler	GrayWolf FM-801 Monitor
Indoor Main (ppb)	N = 68	N = 69
Mean	19.8	18.9
Median	18.2	18.8
10^{th}–90^{th} Percentile	13–28	10–27

Similar to the finding (reported in the main paper) that formaldehyde measured by the UMEx was higher in the bedroom than at the main indoor site, FM-801 data collected in the bedroom also indicated higher period-averaged formaldehyde compared to data collected in the main indoor site (p-value = 4.5e-5 using Student's paired t-test). Among the 65 homes with valid FM-801 data in both locations, formaldehyde in the bedroom was >10% higher than in the living room in 35 homes and less than 90% in 4 homes. The median and 10^{th}–90^{th} ratios of bedroom to living room concentrations were 1.13 and 0.97–1.44. Using data from the FM-801, overnight concentrations in the bedroom were higher than the period-average at that location (p-value = 5.4e-6 using Student's paired t-test). Formaldehyde in the bedroom overnight was >10% higher than the period-average living room in 38 homes and less than 90% in 3 homes. The median and 10^{th}–90^{th} ratios of bedroom overnight to period-average living room concentrations were 1.19 and 0.97–1.52.

Air Pollutant Concentrations: $PM_{2.5}$

A comparison of time-integrated $PM_{2.5}$ measured with the MetOne and Thermo pDR photometers and co-located gravimetric samples are provided in Table S30. **Table S30**

Table S30. Time-integrated $PM_{2.5}$ concentrations measured by MetOne and Thermo pDR-1500 photometers compared with gravimetric analysis of co-located filter samples.

House	City	Dates	MetOne	pDR	Filter	Filter/ MetOne	Filter/ pDR
Indoor PM2.5 (ug/m^3)							
025	Hayward	2017-03-23 to 03-30	3.7	4.5	4.7	1.3	1.1
026	Davis	2017-04-18 to 04-25	2.8	4.3	4.2	1.5	1.0
040	Discovery Bay	2017-05-23 to 05-30	2.1	3.2	2.8	1.3	0.9
029	Brentwood	2017-06-09 to 06-16	3.1	3.8	3.7	1.2	1.0
047	Clovis	2017-10-12 to 10-19	31.9	30.1	23.5	0.7	0.8
046	Clovis	2017-11-08 to 11-15	5.1	6.9	5.0	1.0	0.7
068	Manteca	2018-01-24 to 01-31	2.6	4.2	3.6	1.4	0.9
066	Manteca	2018-02-05 to 02-12	2.7	4.3	4.0	1.4	0.9
Outdoor PM2.5 (ug/m^3)							
025	Hayward	2017-03-23 to 03-30	NA	5.6	4.1	NA	0.7
026	Davis	2017-04-18 to 04-25	NA	3.4	4.4	NA	1.3
040	Discovery Bay	2017-05-23 to 05-30	4.5	5.1	4.8	1.1	0.9
029	Brentwood	2017-06-09 to 06-16	3.0	3.9	3.4	1.1	0.9
047	Clovis	2017-10-12 to 10-19	25.5	30.3	19.6	0.8	0.6
046	Clovis	2017-11-08 to 11-15	6.0	NA	NA	NA	NA
068	Manteca	2018-01-24 to 01-31	20.2	18.2	10.6	0.5	0.6
066	Manteca	2018-02-05 to 02-12	14.0	12.4	5.6	0.4	0.4

Analysis of Regulatory Air Monitoring Data to Estimate $PM_{2.5}$ Outside of HENGH Homes

We investigated the possibility of using regulatory ambient air monitoring station data to develop correction factors for photometers outside of the homes. We identified up to three regulatory air monitoring stations near each of the study home. Figure S1 show locations of the air quality monitoring stations in relationship to the study home. The air monitoring stations were all located within 30 km of the study home, selected to broadly represent the air quality at that location. Air monitoring stations sited to monitor near-road concentrations (located within 100 m of a major roadway) were excluded to avoid biases from traffic emissions. The daily mean $PM_{2.5}$ were obtained from AQMIS.

We applied inverse distance weighting to calculate the daily mean $PM_{2.5}$ at the study home, and calculated the mean $PM_{2.5}$ for the monitoring period (~6 days). Results of the inverse distance weighted ambient monitoring data are compared with the outdoor $PM_{2.5}$ measured using MetOne photometer in **Error! Reference source not found.**.

Table S31 shows the differences in mean $PM_{2.5}$ measured using the MetOne photometer and inverse distance weighted ambient monitoring data. Because the ambient monitoring data obtained from AQMIS are daily means, the results presented in Table S31Table S31 considered only days with full 24-h data as monitored by the MetOne photometer (i.e., partial days on first and last day of monitoring were excluded). The mean, median, and 10^{th} percentile estimates of PM2.5 measured by the MetOne photometer were less than what was measured at the corresponding ambient monitoring station. This suggests that the MetOne photometer may have underestimated the outdoor PM2.5 relative to the ambient monitoring data at some of the homes. However, the reverse is true for other homes such that the MetOne photometer measurements were higher than the ambient monitoring data when compared at 90^{th} percentile. No correction factor is applied to outdoor MetOne because of a lack of consistency when compared with the ambient monitoring data.

Table S31. Summary statistics (N=67) of the mean outdoor PM2.5 measured using MetOne photometer and inverse distance weighted ambient monitoring data.

	MetOne photometer (ug/m^3)	Nearby ambient air quality monitoring stations (ug/m^3)
Mean	9.3	10.5
Median	6.8	9.7
10^{th}–90^{th}	2.7–18.1	5.3–16.7

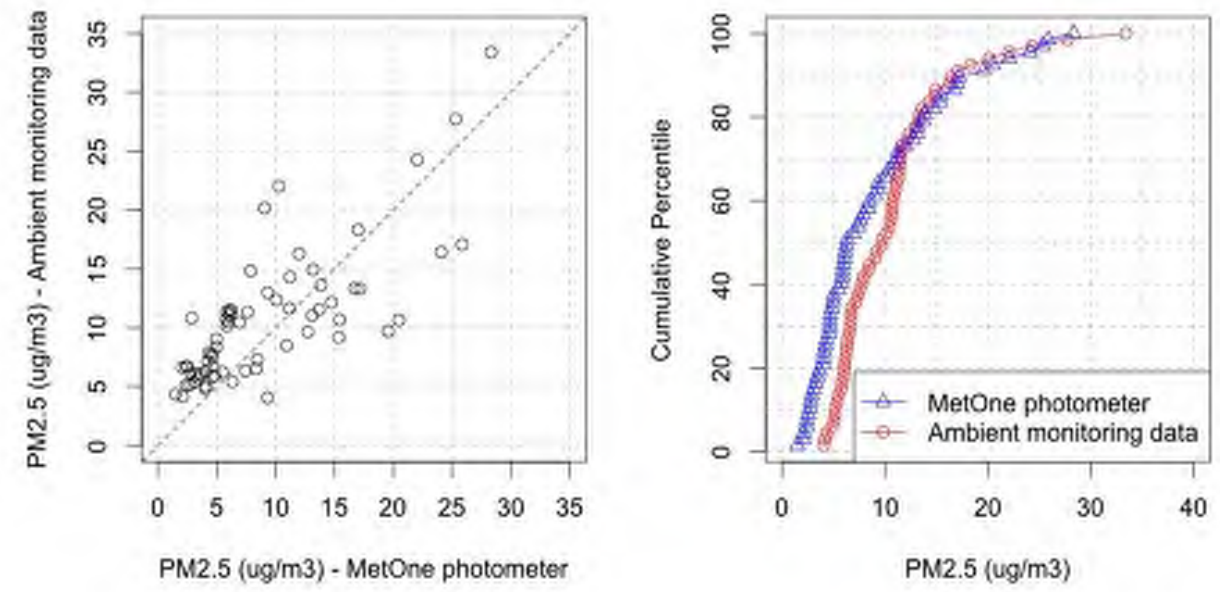


Figure S7. Comparison between mean outdoor $PM_{2.5}$ measured using MetOne photometer and inverse distance weighted ambient monitoring data (N=67).

Air Pollutant Concentrations: Nitrogen Dioxide and Nitric Oxide

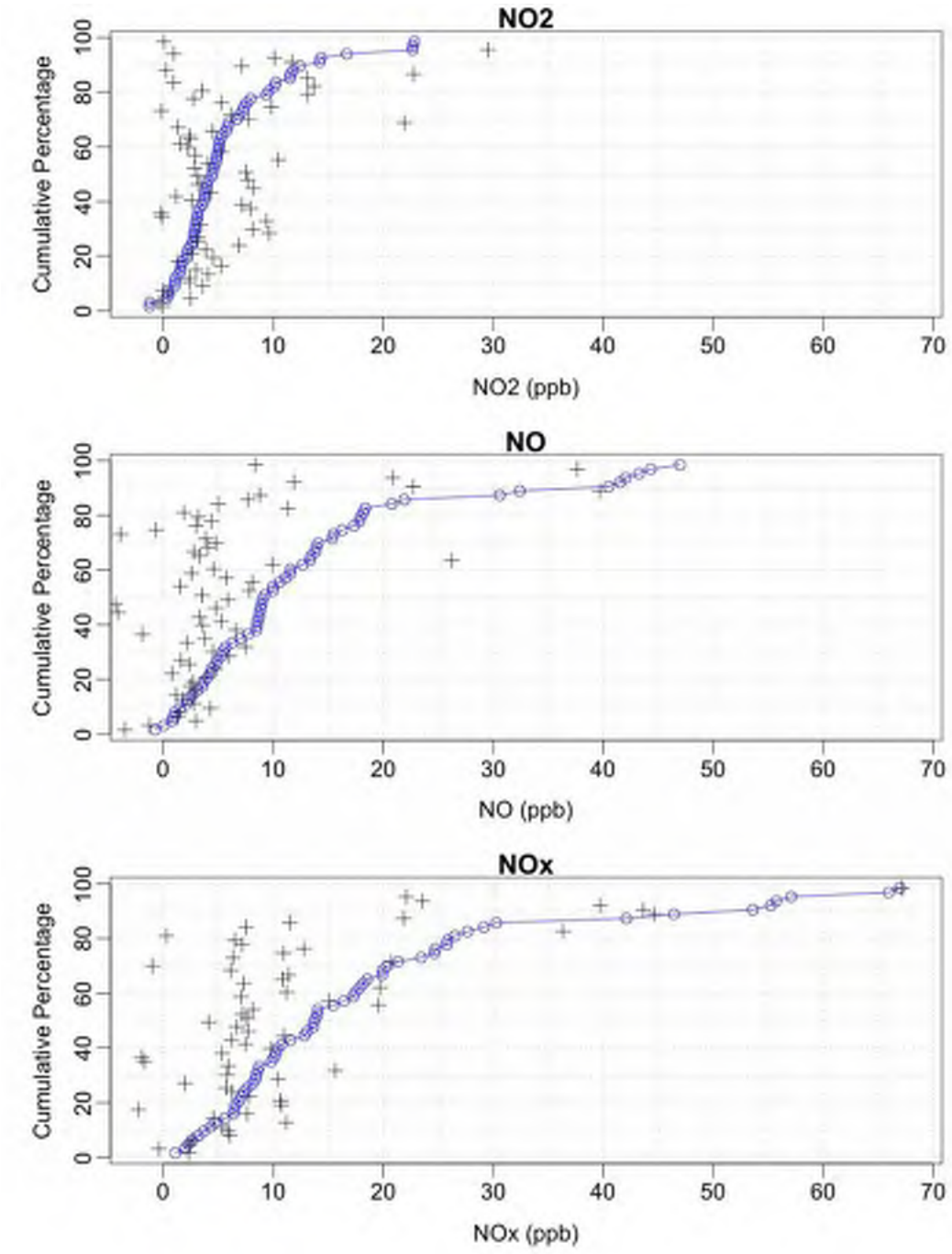


Figure S8: One-Week Integrated NO2, NO, and NOx Concentrations

Ranked ordered by indoor concentrations (blue circles), with corresponding outdoor concentrations plotted as black crosses.

Air Pollutant Concentrations: CO_2

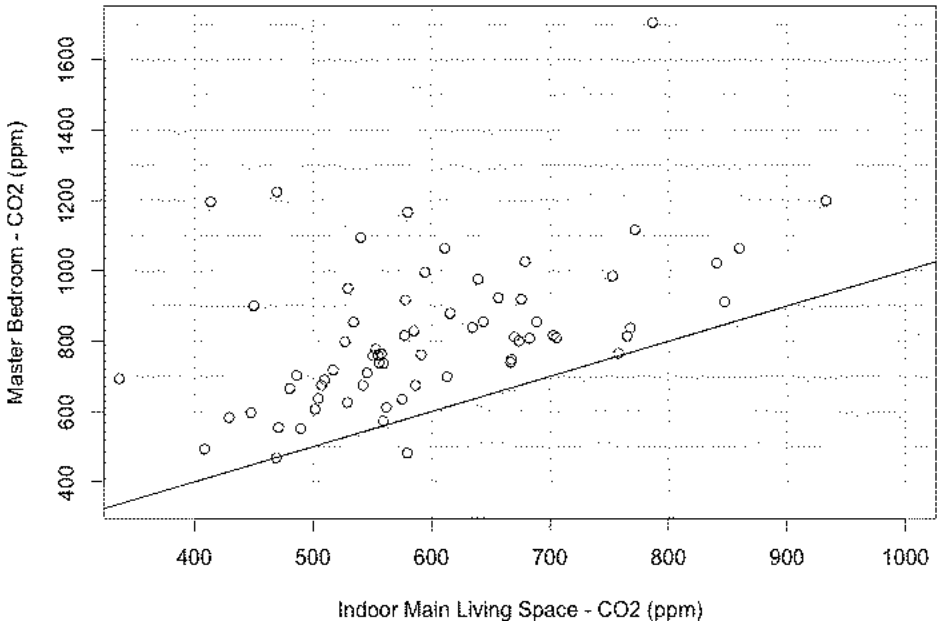


Figure S9: Overnight (midnight-5am) CO_2 measurements in indoor main living space and master bedroom.

IEQ Satisfaction by Ventilation System Operation

Tables S33 to S35 present air quality and comfort satisfaction reported by participants, divided by whether the dwelling unit ventilation system was operating when the research team arrived to the home. The Fisher's exact test for count data was performed to determine if there is an association between the ventilation system operating at that time and satisfaction. Survey responses for satisfaction were scored using a scale between 1 and 9. For the Fisher's test, satisfaction responses were classified into four groups: dissatisfied (1–4), neutral (5), satisfied (6–7), and very satisfied (8–9). Survey responses for frequency of a discomfort were provided using a 5-level scale: (i) never, (ii) a few times a year, (iii) a few times a month, (iv) a few times a week, and (v) every day. For the Fisher's test, frequency responses were classified into two groups: infrequent (i, ii, or iii) and frequent (iv or v).

Table 32. Air quality satisfaction reported by participants.

	To what extent are you satisfied or dissatisfied with indoor air quality in your home?		How would you rate the outdoor air quality where you live?		How would you rate your home in protecting you from outdoor air pollution?	
Ventilation As-Found	Off	On	Off	On	Off	On
Dissatisfied	3	3	11	8	3	2
Neutral	13	3	9	2	18	3
Satisfied	17	4	17	6	15	6
V. Satisfied	17	8	10	2	14	7
p-value	0.375		0.413		0.444	

Table 33. Satisfaction with seasonal temperature conditions by ventilation system status on first visit to home.

	Winter / Some rooms are too hot[1]		Winter / Some rooms are too cold[1]		Summer / Some rooms are too hot[1]		Summer / Some rooms are too cold[1]	
Ventilation As-Found	Off	On	Off	On	Off	On	Off	On
Infrequent	41	13	36	10	37	9	45	15
Frequent	6	4	12	8	13	9	2	1
p-value	0.435		0.144		0.081		1	

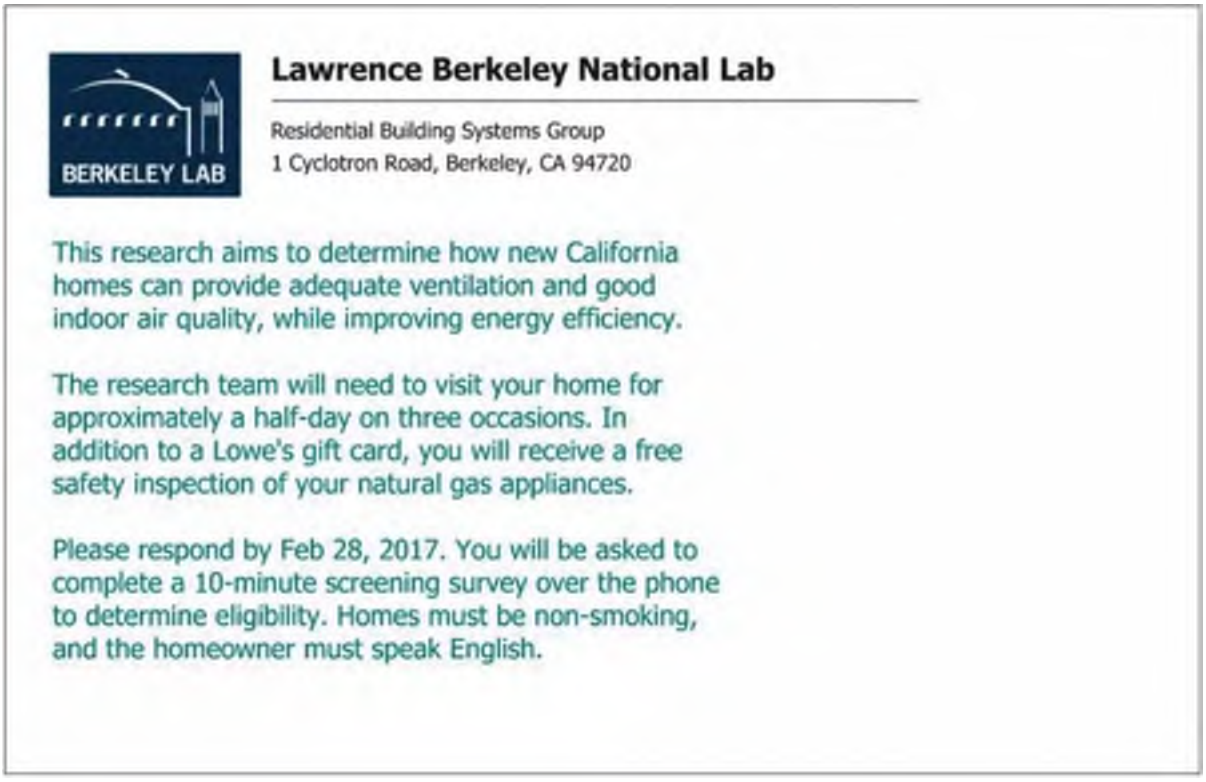
[1] Survey question: In [season], how often is the temperature in your home uncomfortable to any occupants because [condition]?

Table 34. Satisfaction with environmental parameters by ventilation system status on first visit to home.

	Too much air movement		Not enough air movement		Indoor air is too dry		Indoor air is too damp		Indoor air has musty odor	
Ventilation As-Found	Off	On	Off	On	Off	On	Off	On	Off	On
Infrequent	48	18	41	11	43	17	49	18	48	17
Frequent	1	0	8	7	5	1	1	0	1	0
p-value	1		0.094		1		1		1	

[1] Survey question: How often do the following conditions affect the comfort of occupants in your home? Frequent is on weekly or daily basis.

Recruitment Postcard



Daily Activity Log

Provided below is the top page of the activity log. Participants were asked to complete a log table for each calendar day during which measurements were being made in the home. Participants were provided with paper sheets containing a log for each day.

Healthy Efficient New California Homes Study
Occupancy and Indoor Activities Data Log

Instructions: Please fill out this data log each day, or on the following day.

Please enter your best estimates. If you are unsure, please provide your best guess.
Do not list the names of any people.

Code number for home _____

Day 1: Date _____ Date completed _____

	Midnight to 7am	7am to 11am	11am to 1pm	1pm to 5 pm	5pm to 9pm	9pm to Midnight
Number of people in home						
Cooktop use Number of minutes						
Oven use Number of minutes						
BBQ/outdoor grill Number of minutes						
Vacuuming Number of minutes						
Window Use Number of minutes						
Other notable* indoor/outdoor events						

* For example, use of fireplace, candle, air freshener, air cleaner, humidifier, unusual outdoor air quality (wood smoke, wildfire), and so on.

Occupant Survey

Welcome to the 2015 California New Homes Survey!

This survey is part of a research study on new homes in California. This research will help inform how new homes can provide adequate ventilation and good indoor air quality, while reducing air infiltration and energy use.

This survey takes about 15 minutes to complete. It asks questions about your home, household activities, and demographics. You can skip questions that you do not want to answer.

This research is being conducted by Lawrence Berkeley National Laboratory (LBNL) with funding from the California Energy Commission. Results will be used only for research on how to provide adequate ventilation and improve indoor air quality. In order to protect your privacy, the data will be encrypted and password protected.

Please return your completed survey in the envelope provided.

If you have questions about the research study, please contact:

Max Sherman, Ph.D.

Principal Investigator, Residential Building Systems Group

Lawrence Berkeley National Laboratory

mhsherman@lbl.gov (510) 486 4022

Code number for home _____ Date completed _____

Please answer to the best of your knowledge. You can skip any questions that you do not want answer.

A. Home and Household Characteristics

1. What year was your house built?
   Year Built: ……

2. What is the size (floor area) of your home?
   Square Feet: ……

3. What year did you move into this home?
   Year Moved In: ……..

4. Do you own or rent your home?
   ……. Own (If yes → 5, skip otherwise)
   ……. Rent
   ……. Other

5. Are you the first owner of the property? Yes / No

6. How many people currently live in your home?
   Number of People: ……..

B. Air Quality In and Around Your Home

7. To what extent are you satisfied or dissatisfied with the indoor air quality in your home?

Very Dissatisfied				Neutral				Very Satisfied
☐	☐	☐	☐	☐	☐	☐	☐	☐

8. How would you rate the outdoor air quality near where you live?

Very Poor				Neutral				Excellent
☐	☐	☐	☐	☐	☐	☐	☐	☐

9. How would you rate your home in protecting you from outdoor air pollution?

Very Ineffective				Neutral				Very Effective
☐	☐	☐	☐	☐	☐	☐	☐	☐

C. Comfort Level in Your Home

10. In winter, how often is the temperature in your home uncomfortable to any occupants because some room(s) are too hot or too cold?

	Never	Few times a year	Few times in a month	Few times a week	Every day
Too hot in some room(s).	☐	☐	☐	☐	☐
Too cold in some room(s).	☐	☐	☐	☐	☐

11. In summer, how often is the temperature in your home uncomfortable to any occupants because some room(s) are too hot or too cold?

	Never	Few times a year	Few times a month	Few times a week	Every day
Too hot in some room(s).	☐	☐	☐	☐	☐
Too cold in some room(s).	☐	☐	☐	☐	☐

12. How often do the following conditions affect the comfort of occupants in your home?

	Never	Few times a year	Few times a month	Few times a week	Every day
Too much air movement.	☐	☐	☐	☐	☐
Not enough air movement.	☐	☐	☐	☐	☐
Indoor air is too dry.	☐	☐	☐	☐	☐
Indoor air is too damp.	☐	☐	☐	☐	☐
Indoor air has musty odor.	☐	☐	☐	☐	☐

D. Natural Gas Appliances and Mechanical Ventilation

13. Which of the following heating appliances are used in your home? Select all that apply.
    ..…... Central gas furnace
    ……. Gas fireplace/ log set
    ……... Gas wall furnace
    ……. Freestanding gas heater
    ……. Central electric heating or heat-pump
    ……. Baseboard electric wall heater
    ……. Freestanding electric heater
    ……. Wood fireplace
    ……. Freestanding propane heater
    ……. Freestanding kerosene heater
    ……. Other. Please describe: ...…….
    ……. Don't know

14. How often is the kitchen range hood or kitchen exhaust fan used when cooking with a cooktop?
    ……. Always (5 out of 5 times)
    ……. Most of the Time (4 out of 5 times)
    ……. Sometimes (2 to 3 out of 5 times)
    ……. Rarely (1 out of 5 times)
    ……. Never (0 out of 5 times)
    ……. Don't know

15. If the kitchen range hood or kitchen exhaust fan is NOT always used, what are the reasons for not using it? Select all that apply.
    ……. Forget to turn it on
    ……. Not needed for what is being cooked
    ……. Too noisy
    ……. Doesn't seem to remove cooking fumes or odors
    ……. Open window instead
    ……. Uses too much energy
    ……. Other. Please describe: …….....

16. Was the operation of the mechanical ventilation system explained to you when you bought or moved into the home?
    ……. Yes
    ……. No
    ……. Don't know

17. Do you feel you understand how to operate your mechanical ventilation system properly?
    ……. Yes
    ……. No
    ……. Not Sure

18. To what extent are you satisfied or dissatisfied with your mechanical ventilation system?

Very Dissatisfied				Neutral				Very Satisfied
☐	☐	☐	☐	☐	☐	☐	☐	☐

19. If you are NOT very satisfied with your mechanical ventilation system, what are the reason(s) for dissatisfaction? Select all that apply.
    ……. Too noisy
    ……. Too drafty
    ……. Difficult to operate
    ……. Difficult to maintain
    ……. Uses too much energy
    ……. Brings in dust, odor, or air pollutants from outdoor
    ……. Not effective
    ……. Other. Please describe: …….

E. Occupancy and Indoor Activities

20. On average, how many hours per day is your home occupied by at least one person, including day and night hours?

	Fewer than 8 hours per day	8 to 12 hours per day	12 to 16 hours per day	16 to 20 hours per day	More than 20 hours per day
Weekday	☐	☐	☐	☐	☐
Weekend	☐	☐	☐	☐	☐

21. On average, how many times per week is your cooktop and/or oven used for cooking, including boiling water?

	0 time per week	1 to 2 times per week	3 to 4 times per week	5 to 6 times per week	7 times per week
Breakfast	☐	☐	☐	☐	☐
Lunch	☐	☐	☐	☐	☐
Dinner	☐	☐	☐	☐	☐
Other cooking	☐	☐	☐	☐	☐

22. On average, how many times per week do the following activities occur inside your home? Enter "0" if occurrence is less frequent than once a week.

Use shower	(Times per week) ……
Use bath or indoor Jacuzzi	(Times per week) ……
Use dishwasher	(Times per week) ……
Use washing machine	(Loads per week) ……..
Hang clothes to dry indoors	(Loads per week) ……..

F. Window Opening

23. On average, how many hours per day are your windows open?

	0 hour per day	1 to 2 hour per day	2 to 8 hours per day	8 to 16 hours per day	More than 16 hours per day
Summer	☐	☐	☐	☐	☐
Fall	☐	☐	☐	☐	☐
Winter	☐	☐	☐	☐	☐
Spring	☐	☐	☐	☐	☐

G. Indoor Activities

24. On average, how often do the following activities occur inside your home?

	Never	Few times a year	Few times a month	Few times a week	Every day
Smoking	☐	☐	☐	☐	☐
Burn candle or incense	☐	☐	☐	☐	☐
Vacuuming	☐	☐	☐	☐	☐
Use cleaning agent for floor cleaning	☐	☐	☐	☐	☐
Use spray air freshener	☐	☐	☐	☐	☐
Use pesticide spray	☐	☐	☐	☐	☐
Use paints, glue, solvents (e.g., hobbies, home repairs)	☐	☐	☐	☐	☐
Use humidifier	☐	☐	☐	☐	☐
Use dehumidifier	☐	☐	☐	☐	☐

H. Other Indoor Sources

25. Are plug-in or stick air fresheners, or other scented decorations, used in your home?
    ……. Yes
    ……. No
    ……. Don't know

26. Do occupants wear shoes in your home?
    ……. Yes
    ……. No
    ……. Don't know

40. How many dogs, cats, or other furry pets are in the home?

    Number of Pets: ……

I. Use of Air Cleaners

27. Do you use a stand-alone (portable) air filter, air purifier, or air cleaner in the home?
    ……. Yes
    ……. No
    ……. Don't know

28. Where is your stand-alone (portable) air filter, air purifier, or air cleaner located in your home? Select all that apply.
    ……. Master bedroom
    ……. Other bedroom(s)
    ……. Living room
    ……. Home office
    ……. Other. Please describe: …….....

29. Has anyone in the household been diagnosed with asthma?
    ……. Yes
    ……. No
    ……. Don't know

30. Has anyone in the household been diagnosed with allergies?
    ……. Yes
    ……. No
    ……. Don't know

J. Demographic Information

The next questions will help us interpret the results of the survey. All responses will be kept confidential.

31. Please indicate the number of household member(s) in the following age categories.

	Number of household member(s)
0 to 17 Years Old	……
18 to 65 Years old	……
Over 65 Years old	……

32. What is the highest education level of head of household?
    - …….. No schooling completed
    - …….. 1 to 8th grade
    - …….. 9th to 12th grade
    - …….. Completed high school (high school diploma, GED credential)
    - …….. Some college
    - …….. Associate's degree
    - …….. College degree (Bachelor's degree)
    - …….. Graduate degree (Master's, Professional school, Doctorate degree)

33. Please indicate <u>all</u> races and/or ethnicities of people living in your household.
    - …….. American Indian, Alaska Native
    - …….. Asian or Pacific Islander
    - …….. Black, African American
    - …….. Hispanic/ Latino
    - …….. White, Caucasian
    - …….. Other, specify: …….
    - …….. Mixed race, specify: …….

34. What is the total income of all member(s) of your household combined?
    - …….. Less than $35,000
    - …….. $35,000 to $ 49,999
    - …….. $50,000 to $ 74,999
    - …….. $75,000 to $ 99,999
    - …….. $100,000 to $150,000
    - …….. Greater than $150,000

K. End of Survey

Thank you for filling out this survey! Your data is very valuable to our understanding of indoor air quality and mechanical ventilation in new California homes.

Please return your completed survey in the envelope provided.

If you have any questions about the survey, please contact: [LBNL contact provided]

Attachment 26
Buchalter/ECORP Comment Response Letter, Dated June 15, 2026

Buchalter

425 Market Street
Suite 2900
San Francisco, CA 94105
415.227.0900 Phone
415.227.0770 Fax

415.227.3508 Direct
aguerra@buchalter.com

June 15, 2026

Jessica Brandt, Principal Planner
Planning Department
City of Folsom
50 Natoma Street
Folsom, CA 95630

Re: Toll Brothers' Response to Late-Submitted Comments of Laborers Union of North America, Local Union 185 for Toll Brothers at Alder Creek Project, File # MSTR25-00084

Dear Ms. Brandt:

Buchalter, LLP, ("Buchalter") represents Toll Brothers, Inc. ("Toll Brothers") as land use counsel regarding its project to develop 1,424 single-family homes and associated infrastructure (the "Alder Creek Project" or "Project") on an approximately 464.2-acre project site (the "Property") located in the Folsom Plan Area Specific Plan ("FPASP") in the City of Folsom (the "City"). The Toll Brothers Alder Creek Project includes 1,488 lots for the development of 1,424 dwelling units and private recreation, parks, landscaping, open space, roadways, fire stations, and an elementary school. Since early last year, Toll Brothers applied for and has been processing with the City a Small Lot Vesting Tentative Map, Planned Development Permit, Design Guidelines, Landscape Guidelines, and a Minor Administrative Modification to develop the Project (the "Project Approvals").

The purpose of our letter is to respond to late hit comments from Lozeau Drury LLP that were submitted to the City of Folsom on behalf of the Laborers International Union of North America, Local Union 185 ("LIUNA") regarding Agenda Item No. 10 of the June 9, 2026 City Council hearing for the Toll Brothers at Alder Creek Project (File #MSTR25-00084). Never having participated in *any* City proceedings concerning any FPASP projects since its adoption 15 years ago, now LIUNA, has shown up at the end of the approval process for Toll Brothers' Project even though it is consistent with the FPASP. At the eleventh hour, LIUNA improperly claims the Project requires further environmental review under the California Environmental Quality Act (CEQA) based on supposed new information and changed circumstances which

LIUNA contends requires supplemental environmental review, even though the only information LIUNA provides is information generated by LIUNA that does not apply to the Project as further explained below. LIUNA has not provided any substantial evidence to support any of the claims raised in LIUNA's June 8, 2026 Letter as demonstrated in the attached memorandum entitled, "Alder Creek – Conformity Analysis," prepared by ECORP Consulting, Inc. dated June 12, 2026 ("ECORP Memorandum"). For the reasons discussed in this letter and the attached, we respectfully request that the City Council disregard LIUNA's comments and approve the Alder Creek Project based on the Alder Creek Conformity Analysis.

The City Conducted Prior CEQA Review of the FPASP and Concluded that the Alder Creek Project Would Not Require a Supplemental EIR Because There are No New Significant or Substantially Greater Environmental Impacts.

The Project is located in the FPASP area and was previously subject to an Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Folsom South of U.S. Highway 50 Specific Plan Project. The City of Folsom and U.S. Army Corps of Engineers (USACE) jointly prepared an EIR/EIS to fulfill requirements of the California Environmental Quality Act (CEQA) and National Environmental Policy Act, respectively. The City filed a Notice of Determination (NOD) for the EIR on June 15, 2011 (State Clearinghouse [SCH] #2008092051), and the USACE filed a Record of Decision for the EIR/EIS on August 12, 2011, (SPK-2007-02159). The City prepared and adopted a Mitigation Monitoring and Reporting Program (MMRP) when it adopted the FPASP. The approved MMRP outlines mitigation measures required for the projects located in the FPASP, including the Alder Creek West Project. The City later prepared and adopted an Initial Study (IS) and Mitigated Negative Declaration (MND) for the FPASP Backbone Infrastructure ("BB IS/MND") and filed an NOD on February 25, 2015 (SCH #2114122018). The BB IS/MND outlines mitigation measures specifically for the Backbone Infrastructure development.

The City has relied on the FPASP EIR for the approval of subsequent specific residential projects consistent with the FPASP in accordance with Government Code Section 65457. As a specific project proposed in conformance with the FPASP, the Project is subject to a statutory CEQA exemption because the Project was subject to the prior Specific Plan EIR, and subsequent environmental review did not result in the identification of significant and unavoidable environmental impacts. Moreover, CEQA Guidelines section 15182(c) states that "Where a public agency has prepared an EIR on a specific plan after January 1, 1980, a residential project undertaken pursuant to and in conformity to that specific plan is exempt from CEQA if the project meets the requirements of this section. Residential projects covered by this section include but are not limited to land subdivisions, zoning changes, and residential planned unit developments." The 15182 exemption does not apply if an event described in Section 15162 occurs, which is not the case here.

ECORP Consulting prepared the attached August 2025 Alder Creek Conformity Analysis to examine the Project under the FPASP EIR/EIS, pursuant to CEQA Guidelines Section 15182, to determine if any of the events described in CEQA Guidelines Section 15162 have occurred, and were not considered in the FPASP.

Despite the extensive technical information prepared for the Project Conformity Analysis, LIUNA requested that the City prepare a new "supplementary" EIR for the Project Tentative Map due to two primary unsubstantiated claims. First, LIUNA claims with respect to the evaluation of biological resource impacts, that new information of substantial importance exists that was not known at the time the 2011 FPASP EIR was certified, and that the new information will have significant effects not discussed in the EIR. The LIUNA Letter claims that there is substantial evidence of the presence of a special-status species, which has the potential to result in significant impacts to the species, is cause for requiring a supplemental EIR. Second, LIUNA claimed that CEQA requires a new EIR when new air quality mitigation measures become available after the 2011 FPASP EIR/EIS was certified. The June 12th ECORP Memorandum confirms that the LIUNA Letter did not identify any new significant impacts warranting supplemental environmental review as further discussed below and in the attached ECORP Memorandum.

Substantial Evidence Supports the Alder Creek Conformity Analysis.

CEQA requires that an EIR include adequate information to ensure informed decisions are made about a project. CEQA further requires that the lead agency evaluate whether or not a proposed project will result in a significant environmental impact based on substantial evidence. Under Public Resources Code Section 21082.2(c), substantial evidence includes facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts. Argument, speculation and unsubstantiated opinion are not substantial evidence. The substantial evidence standard of review applies to disagreements concerning the methodology used for studying an impact, and the reliability or accuracy of the data upon which the EIR relied. Even when commenters suggest that different conclusions should be reached, or different methods of gathering and compiling statistics could have been used, that does not constitute substantial evidence. The issue is not whether other methods might have been used, "but whether the agency relied on evidence that a reasonable mind might accept as sufficient to support the conclusion reached in the EIR." *North Coast Rivers Alliance v. Marin Municipal Water Dist. Bd. Of Directors,* 216 Cal.App.4th 614, 615 (2013). Moreover, when an agency prepares an EIR (and subsequent environmental documents relying upon them), the issue is whether substantial evidence supports the agency's conclusions, not whether others might disagree with those conclusions (*North Coast Rivers Alliance v. Marin Municipal Water Dist. Bd. Of Directors,* 216 Cal.App.4th 614, 624 (2013)).

Contrary to LIUNA's unsubstantiated claims, the FPASP EIR was based on substantial evidence in the administrative record as documented in the ECORP Conformity Analysis and

extensive technical reports upon which that analysis is based. Since the City certified the EIR in 2011, the City has relied on this evidence for its approval of the subsequent entitlements necessary to implement the FPASP. As the ECORP Memorandum explains, substantial evidence supports the City's reliance on the prior FPASP EIR for the Project Approvals the results of which are documented in the Conformity Analysis.

The City Council Must Approve the Project in Accordance with the Housing Accountability Act.

The Legislature has long recognized that "housing is of vital statewide importance," and the provision of suitable housing for every Californian is "a priority of the highest order." (Gov. Code § 65580(a).) But California is in the midst of a housing crisis, and to address California's severe housing shortage, the Legislature enacted the Housing Accountability Act ("HAA") to significantly limit a local government's ability to deny, reduce the density of, or make infeasible housing development projects that provide affordable housing units. (Gov. Code § 65589.5(d).)

Toll Brothers predecessor in interest obtained entitlements for the FPASP Project along with associated infrastructure for the 464.2 acre Project site as part of five permit areas: Mangini Ranch, Alder Ranch (also known as Folsom 560 and Hillsborough), Carpenter Ranch, Javanifard and Zarghami Property (J & Z Property) (see Conformity Analysis, page 2-3). The Alder Creek Project Approvals include the Small Lot Vesting Tentative Map for 1,424 residential lots consistent with the General Plan land use designations and FSASP designations. Under the HAA, the City may not deny, reduce the density of or make the Project infeasible unless there is a preponderance of the evidence demonstrating that the housing development will result in a significant public health and safety impact.

That could not be further from the case here. LIUNA's comments address only the existence of the listing of species which is not a new impact under CEQA, and new mitigation measures to address operational air quality impacts that are typical of mobile source and construction source emissions associated with other residential projects in the community. There is no evidence whatsoever that approval of the specific Project Approvals for the Alder Creek Project would result in any public health and safety impacts. For that reason, the City Council should uphold the Planning Commission's recommendation for Project approval in accordance with the HAA, and reject LIUNA's last minute unsubstantiated efforts to hold the residential project hostage to study impacts that were already evaluated and mitigated by the Project's implementation of the FPASP EIR mitigation measures.

Substantial Evidence Supports the City's Determination that the Project would not Trigger any New Significant Environmental Impacts and would not Require Subsequent Environmental Review under Public Resources Code § 21166.

CEQA defines an approval as the decision by a public agency committing the agency "to a definite course of action in regard to a project intended to be carried out." (CEQA Guidelines, § 15352(a).) For private projects, an approval "occurs upon the earliest commitment to issue" some discretionary entitlement. (CEQA Guidelines, § 15352(b).) CEQA further limits the situations in which an activity will be subject to additional CEQA review, after a lead agency has already satisfied the environmental review requirements. Under Public Resources Code section 21166 and CEQA Guidelines section 15162, if a lead agency has already certified an EIR for a project, a subsequent discretionary approval will not be subject to CEQA review unless:

> (1) substantial changes are proposed in the project which will require major revisions of the EIR;
> (2) substantial changes occur with respect to the circumstances under which the project is being undertaken which will require major revisions in the EIR; or
> (3) new information which was not known and could not have been known at the time the EIR was certified as complete, becomes available.
> (Pub. Res. Code, § 21166; CEQA Guidelines, § 15162.)

Once an EIR has been certified for a Project CEQA does not require a new EIR unless there are new significant or substantially more severe impacts associated with a subsequent discretionary approval in accordance with Public Resources Code Section 21166 and CEQA Guidelines Section 15162. Even if changed circumstances occur (which is not the case here per the ECORP Memorandum and the 2025 Conformity Analysis), subsequent environmental review will not be required if the resulting environmental impacts were already addressed in the prior EIR or if the changed circumstances will not result in effects that are substantially more severe than those previously evaluated. (*Committee for Re-Evaluation of the T-Line Loop v. San Francisco Mun. Transp. Agency* (2016) 6 Cal.App.5th 1237, 1255-56.) In this case, the City complied with CEQA when it certified the 2011 EIR, and then when it adopted an IS/MND in 2015 for the Backbone Infrastructure for the FPASP area. When the City adopted the Specific Plan, the City committed to the Project as part of the entire development of the FPASP area, a portion of which included the Alder Creek Project 1,424 units included in the FPASP. It was at that time that the City could (and did) impose conditions of approval and mitigation measures to reduce the Project's environmental impacts evaluated in the 2011 EIR.

Even though the City Council is now considering approval for the Project's Small Lot Vesting Tentative Map and other Project Approvals consistent with the prior 2011 Specific Plan, none of the circumstances exist (described above) that would require subsequent CEQA review, especially under the statutory exemption pursuant to Government Code section 65674 and CEQA Guidelines Section 15182. The LIUNA letter did not identify any new information associated with the Project Approvals that would show that there are significant changes in the Project or circumstances under which it was approved that would result in new significant or substantially greater impacts than the previously identified Project impacts already evaluated the

2011 EIR. Since nothing about the Project or how it is being developed has changed, and because the Project will not result in any new substantial environmental impacts, no additional CEQA review is required as a result of the City Council's approval of the Project Approvals. The City's reliance on the 2011 EIR to approve the Project Approvals therefore complies with CEQA.

There is No Evidence that Residents will be Subject to Sustained Elevated Indoor Formaldehyde Levels.

Public Resources Code Section 21166 and CEQA Guidelines Section 15162 provide that no subsequent EIR shall be prepared unless the lead agency determines on the basis of substantial evidence, that new information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the Negative Declaration was adopted, shows that the Project would result in new significant impacts. As addressed in the ECORP Memorandum, LIUNA mistakenly claims the City must prepare another EIR for the Project because of some speculative assertion that residents would be exposed to indoor levels of formaldehyde purportedly resulting in new impacts since the City certified the 2011 FPASP EIR. LIUNA has not provided any substantial evidence to support their claim that the Project will be constructed with building materials with significant amounts of formaldehyde.

The California Air Resources Board ("CARB") and Sacramento Metropolitan Air Quality Management District ("SMAQMD") do not require the evaluation of indoor formaldehyde emissions from building materials and practices for residential uses. Nonetheless, as the ECORP Memorandum states, the Project is required to and will comply with applicable California Air Resources Board ("CARB") and Sacramento Metropolitan Air Quality Management District ("SMAQMD") requirements. Consequently, LIUNA fails to provide any evidence that the Project would result in any new significant impacts associated with formaldehyde levels.

The Availability of New Air Quality Mitigation Measures does not Require Preparation of a Supplemental EIR.

As analyzed in the ECORP Memorandum, LIUNA mistakenly claims the City must prepare another EIR for the Project because EV charging infrastructure and battery storage systems for each new residence would substantially reduce significant and unavoidable air quality and greenhouse gas emissions ("GHG") impacts previously identified in the FPASP EIR. With respect to the existence of possible new air quality mitigation measures (assuming they are feasible), Public Resources Code Section 21166 and CEQA Guidelines Section 15162 provide that no subsequent EIR shall be prepared unless the lead agency determines on the basis of substantial evidence, that:

> (a)(3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the Negative Declaration was adopted, shows any of the following:
>
> (D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the *project proponents decline to adopt the mitigation measure* or alternative. (Emphasis added.)

The LIUNA Letter asserts that a "supplementary" EIR is required to include new mitigation measures such as installing Level 2 EV charging infrastructure and battery storage systems at each residence and suggests that the City can just revise the 2011 EIR mitigation measures to improve on the prior measures that the City already adopted and for which conditions of approval were incorporated into the prior Project approvals to address significant and unavoidable air quality and GHG impacts. However, the California Building Code requirements already address EV capable infrastructure and the Project is required to comply with State law. LIUNA misstates CEQA's requirements. The mere availability of new mitigation measures does not, by itself, trigger a subsequent or supplemental EIR. That is not what CEQA requires. Rather, pursuant to CEQA Guidelines Section 15163, a subsequent EIR is required if, and when "project proponents decline to adopt" the newly available mitigation measures. In this case, Toll Brothers agreed to incorporate the prior required mitigation measures into its Project, and there is no evidence to suggest that it won't comply with the applicable conditions of approval. There is no substantial evidence in the record indicating that Toll Brothers declined to adopt any applicable mitigation measures included in the 2011 EIR.

With respect to the Project Approvals, LIUNA has not provided any evidence that the City's approval of the Small Lot Vesting Tentative Map, Planned Development Permit, Design Guidelines, Landscape Guidelines, and a Minor Administrative Modification included in the certified 2011 EIR would have otherwise required new or different mitigation measures. They are unable to do so because the Project includes the same number of dwelling units compared to the approved Project and there are no new or substantially greater air quality impacts associated with building the same number of housing units evaluated in the 2011 EIR. Because there are no new impacts or substantially greater air quality impacts compared to the prior EIR analysis, CEQA does not require that the City change the mitigation measures it already adopted when it approved the 2011 FPASP and the Project.

LIUNA has failed to demonstrate that there is substantial evidence requiring that the City replace the prior adopted mitigation measures with new measures to mitigate the same impacts caused by the Project. CEQA does not require a new EIR simply because a project opponent prefers that the lead agency replace mitigation measures that were already effective in reducing

the impact to a less than significant level. Accordingly, CEQA allows the City to rely on the prior 2011 EIR for the Project Approvals.

We respectfully request that the City Council disregard LIUNA's comments on the Project and uphold the Planning Commission's approval of the Project. Based on the substantial evidence in the administrative record, the City Council may – and should in accordance with the statutory Specific Plan exemption -- properly rely on the 2011 EIR and approve Project in accordance with the HAA.

Toll Brothers appreciates the City's consideration of the attached ECORP Memorandum and looks forward to the City Council's approval of the Project at its upcoming meeting.

Sincerely,

BUCHALTER LLP

Alicia Guerra
Partner

AG:nj

Attachments

cc: City Clerk
Sari Myers Dierking, Interim City Attorney
Demond Parrington, Planning Manager
Martin Nivinski
Andrew Gunson
Scott Esping
Greg Van Dam

MEMORANDUM

TO: Martin Nivinski

CC: Jessica Brandt

FROM: ECORP Consulting, Inc.

DATE: June 12, 2026

RE: Alder Creek – Conformity Analysis

SUMMARY

In August 2025, a CEQA Guidelines Section 15182 and 15162 Conformity Analysis was prepared for the Toll Brothers Property, Alder Creek Subdivision Tentative Map. The Conformity Analysis evaluated the approval of a Small Lot Vesting Tentative Map, Planned Development Permit, Design Guidelines, Landscape Guidelines, and a Minor Administrative Modification. The project area covers approximately 464.2 acres and includes 1,424 single-family dwelling units of varying densities. Additionally, various parcels are designated for land uses such as private recreation, parks, landscaping, open space, roadways, fire stations, and an elementary school, creating a total of 1,488 lots.

On June 8, 2026, Lozeau Drury LLP submitted a letter to the City of Folsom on behalf of the Laborers International Union of North America, Local Union 185 ("LIUNA") regarding Agenda Item No. 10 of the June 9, 2026 City Council hearing for the Toll Brothers at Alder Creek Project (File #MSTR25-00084). The letter focuses on compliance with the California Environmental Quality Act (CEQA) and argues that new information and changed circumstances require subsequent or supplemental environmental review.

CALIFORNIA ENVIRONMENTAL QUALITY ACT COMPLIANCE

CEQA applies to proposed projects initiated by, funded by, or requiring discretionary approvals from state or local government agencies. As such, the proposed project constitutes a project as defined by CEQA (California Public Resources Code, Section 21000 et seq.). CEQA Guidelines Section 15367 states that a "Lead Agency" is "the public agency which has the principal responsibility for carrying out or approving a project." Therefore, the City of Folsom (City) is the lead agency responsible for compliance with CEQA for the proposed project. An Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Folsom South of U.S. Highway 50 Specific Plan Project was prepared jointly by the City of Folsom and U.S. Army Corps of Engineers (USACE) to fulfill requirements of the California Environmental Quality Act (CEQA) and National Environmental Policy Act, respectively. A Notice of Determination (NOD) for the EIR

was filed by the City of Folsom on June 15, 2011 (State Clearinghouse [SCH] #2008092051), and a Record of Decision for the EIR/EIS was filed by the USACE on August 12, 2011, (SPK-2007-02159). A Mitigation Monitoring and Reporting Program (MMRP) was prepared and adopted with the Folsom Plan Area Specific Plan (FPASP) and is a binding document applicable to the Alder Creek Property development (see Appendix A of the Conformity Analysis). The approved MMRP outlines mitigation measures required for all projects located within the FPASP. An Initial Study (IS) and Mitigated Negative Declaration (MND) was prepared for the FPASP Backbone Infrastructure (BB IS/MND), and an NOD was filed by the City of Folsom on February 25, 2015 (SCH #2114122018). The BB IS/MND outlines mitigation measures specifically for the Backbone Infrastructure development. The mitigation measures in the BB IS/MND mirror the original EIR/EIS with some modifications. The Conformity Analysis was prepared to examine the project in light of the FPASP EIR/EIS (City of Folsom 2011), pursuant to CEQA Guidelines Section 15182, to determine if any of the events described in CEQA Guidelines Section 15162 have occurred, and were not considered in the FPASP.

The CEQA Guidelines section 15182(c) states that "Where a public agency has prepared an EIR on a specific plan after January 1, 1980, a residential project undertaken pursuant to and in conformity to that specific plan is exempt from CEQA if the project meets the requirements of this section. Residential projects covered by this section include but are not limited to land subdivisions, zoning changes, and residential planned unit developments." The 15182 exemption shall not apply if an event described in Section 15162 occurs, which includes the following circumstances:

> "(1) substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;
>
> (2) substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or Negative Declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or
>
> (3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the Negative Declaration was adopted, shows any of the following:
>
> A. The project will have one or more significant effects not discussed in the previous EIR or negative declaration;
>
> B. Significant effects previously examined will be substantially more severe than shown in the previous EIR;
>
> C. Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or

D. Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative."

For purposes of the conformity analysis, however, because the proposed project implements and is consistent with the FPASP, and none of the factors set forth in CEQA Guidelines Section 15162 are present or have been identified, pursuant to CEQA Guidelines Section 15182, the City finds that the project is exempt from further CEQA compliance. The City further finds that the project is also exempt pursuant to Government Code Section 65457.

Biological Compliance

The Project would not result in a new significant impact to special-status species.

The primary issue raised in the comment letter for biological resources is the contention that new information of substantial importance exists that was not known at the time the previous EIR was prepared, and that the new information will have significant effects not discussed in the EIR. The letter states that substantial evidence of the presence of a special-status species, which has the potential to result in significant impacts to the species, is cause for requiring a supplemental EIR.

Exhibit A, Table 1, of the comment letter includes a list of special-status wildlife species occurring "at or near" the Project Site. It defines "nearby" as within 1.5 to 4 miles, and "in region" as within 4 to 30 miles, and "in range" as within the species' geographic range. The letter identifies several of these species as having new status designations that afford them additional consideration under CEQA.

ECORP Consulting, Inc. (ECORP) disagrees that substantial information exists to demonstrate there would be new significant impacts to special-status species. All of the species on the list provided by the commenter were evaluated by ECORP biologists and species experts for their potential to occur in the Project Area using reliable sources of information, including queries of state and federal agency species' occurrence records and published reference materials (Appendix A). We note that two of the references cited in the comment letter, eBird and iNaturalist, contain unverified records submitted by members of the public who may or may not accurately identify species. ECORP references these sources for general information, but in practice, they cannot be assumed to be a reliable source of validated species occurrences, comparable to the verified databases provided by California Department of Fish and Wildlife (CDFW) and U.S. Fish and Wildlife Service (USFWS).

The letter specifically cites foothill yellow-legged frog (*Rana boylii*) and western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) as being species that were listed as endangered or threatened under the federal Endangered Species Act (ESA) or California ESA (CESA) since the 2011 EIR was prepared and are "likely present in the Project Area." Based on literature reviews and field investigations conducted by ECORP, neither of these species has potential habitat or is likely to occur in the Project Area.

- Foothill yellow-legged frog – This species was evaluated during the biological resources literature review and field surveys conducted in support of the Conformity Analysis. The species occurs in

shallow foothill and mountain streams with cobble substrates. Aquatic features in the Project Area have been extensively surveyed, and suitable habitat does not occur in the Project Area. The historic range of the "South Sierra" Distinct Population Segment of this species roughly corresponds to the El Dorado County boundary eastward (USFWS 2023). The nearest occurrence of species, as documented by the CDFW's California Natural Diversity Data Base (CNDDB) is approximately 4 miles to the northeast, at an elevation more than 200 feet above the Project Area, observed in 1972 and now considered extirpated (CDFW 2026a). All other CNDDB occurrences are limited to higher elevation streams farther east. Foothill yellow-legged frog is not expected to occur in the Project Area.

- Western yellow-billed cuckoo – This species was not specifically evaluated because it does not appear on standard species searches conducted for the Project Area through the CNDDB or U.S. Fish and Wildlife Service's Information for Planning and Consultation (iPAC) online search tool. Western yellow-billed cuckoo requires expansive blocks of tracts of streamside riparian habitats with dense vegetation (USFWS 2014). The Project Area contains only small, isolated patches of riparian vegetation that do not meet the necessary habitat requirements for this species. Additionally, the Project Area is not within the current range of the species, as reported by the USFWS' online interactive species range map (USFWS 2026) or the CDFW's species range data set (CDFW 2026b). The nearest validated historical occurrence is approximately 19 miles away along the Sacramento River and is based on an observation from 1877 and is believed to be extirpated (CNDDB 2026). Thus, further review of this species' habitat requirements and geographic range confirm that Western yellow-billed cuckoo is not expected to occur in the Project Area.

The letter states that three invertebrates species that have been identified as candidates for listing since preparation of the 2011 EIR – Monarch butterfly (*Danaus plexippus*), western bumble bee (*Bombus occidentalis*), and Crotch's bumble bee (*Bombus crotchii*) – are "expected to occur in the Project Area."

- Monarch butterfly - This species was evaluated during the biological resources literature review and field surveys conducted in support of the Conformity Analysis. Within California, overwintering populations of Monarch butterfly are the focus of the USFWS listing petition (USFWS 2024). Overwintering in California occurs at sites along the Pacific Coast, where they roost in eucalyptus, Monterey pines, and Monterey cypress trees. Occurrences outside of this range are not tracked by the CNDDB. Herbaceous vegetation within the Project Area is dominated by nonnative annual grasses with a very low coverage of nectar resources required by Monarchs during the breeding season. Only a few individual milkweed plants, the obligate host plant for larval Monarch butterflies, were observed. Monarch butterflies have not been observed in the Project Area despite multiple surveys conducted by ECORP biologists throughout the Project Area since the species were proposed for listing. ECORP invertebrate specialists were involved in full transect special-status plant surveys providing 100 percent visual coverage of the Project Area on May 1 and 2 and June 25 and 26, 2025. Incidental observations of special-status wildlife species were recorded and mapped when encountered. No monarch butterflies were observed. Given the

low availability of foraging resources and lack of observations, Monarch butterfly is not expected to occur in the Project Area.

- Western bumble bee - This species was evaluated during the biological resources literature review and field surveys conducted in support of the Conformity Analysis. The Project Area is outside of the known current and historic geographic range of Western bumble bee based (CDFW 2023, 2026c). The Western bumble bee occurs at higher elevations in the foothills and mountains of the Sierra Nevada and Coast Ranges. The nearest CNDDB documented occurrence is approximately 12 miles away at an elevation of approximately 1,200 feet above mean sea level (CNDDB 2026). Western bumble bee is not expected to occur in the Project Area.
- Crotch's bumble bee – This species was evaluated during the biological resources literature review and field surveys conducted in support of the Conformity Analysis. Three occurrences of Crotch's bumble bee are documented in the CNDDB within 5 miles of the Project Area (CDFW 2026a), and the Project Area may provide suitable foraging and nesting habitat. However, the species has not been detected in the Project Area despite multiple field surveys conducted since the species was identified as a candidate for listing by CDFW. ECORP invertebrate specialists participated in walking transect special-status plant surveys of the Project Area on May 1 and 2 and June 25 and 26, 2025. These survey dates fall within the colony active period for Crotch's Bumble Bee, the time period with the highest probably of detection of the species (CDFW 2023). During the survey, incidental observations of special-status wildlife species were recorded and mapped when encountered. No bumble bees of any species were observed. Further, herbaceous vegetation within the Project Area is dominated by nonnative annual grasses with a very low coverage of floral resources, estimated at less than 5 percent. Bumble bees rely on a rich supply of flowers to provide foraging resources during the colony's entire life cycle (Xerces Society 2018). Thus, the habitat in the Project Area is potentially suitable, but habitat quality is low, minimal foraging resources are present, and the species has not been observed during multiple rounds of field surveys. Therefore, Crotch's bumble bee is not expected to occur in the Project Area.

The Project will be required to undergo review by CDFW during the notification process for the 1602 Streambed Alteration Agreement. As discussed in the Conformity Analysis, CDFW may require surveys for Crotch's bumble bee prior to the commencement of construction. If the species is observed, avoidance measures will be developed in coordination with CDFW to avoid the potential for "take" of this species during Project construction. Avoidance of take is a non-discretionary statutory requirement under CESA and protects state listed or candidate species at an individual level. Compliance with CESA, in coordination with CDFW, would assure no direct take of Crotch's bumble bee.

The remainder of the letter focuses on special-status bird species that are not state or federally listed as threatened or endangered, and are not candidates for listing.

The letter cites Aleutian cackling goose (*Branta hutchinsii leucopareia*) as a species that has been identified as a special-status species since the 2011 EIR was prepared. Aleutian cackling goose, a subspecies of cackling goose, was removed from ESA listing in 2001, and in 2018 was added to the CDFW

Watch List. CDFW Watch list species are taxa that were previously considered by CDFW to be Species of Special Concern (SSC) but do not currently meet SSC criteria, and for which there is concern and a need for additional information to clarify status (CNDDB 2026). The species is not considered to be threatened, endangered, or rare pursuant to CEQA. Further, there are no CNDDB documented occurrences of Aleutian cackling goose in the Project Area or a 12-quad search radius (Appendix A). Occurrences documented in eBird and iNaturalist are associated with open water habitats such as Lake Natoma. Aleutian cackling goose is not expected to occur in the Project Area.

The letter mentions 14 other bird species that the USFWS has identified as Birds of Conservation Concern (BCC) since 2011. These include:

- Western grebe (*Aechmophorus occidentalis*)
- Franklin's gull (*Leucophaeus pipixcan*)
- Clark's grebe (*Aechmophorus clarkii*)
- Heermann's gull (*Larus heermanni*)
- Calliope hummingbird (*Selasphorus calliope*)
- Western gull (*Larus occidentalis*)
- American avocet (*Recurvirostra americana*)
- Wrentit (*Chamaea fasciata*)
- Pectoral sandpiper (*Calidris melanotos*)
- California thrasher (*Toxostoma redivivum*)
- Lesser yellowlegs (*Tringa flavipes*)
- Cassin's finch (*Haemorhous cassinii*)
- Willet (*Tringa semipalmata*)
- Bullock's oriole (*Icterus bullockii*)

The letter contends that, because USFWS has identified these species as BCC, they are special-status species as defined by the CEQA Guidelines. We note that the BCC designation does not establish that a species is "rare" pursuant to CEQA (CEQA Guidelines §15380). The goal of the Birds of Conservation Concern 2021 report is to identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent the highest conservation priorities (USFWS 2021). The 2021 USFWS report states, "this list makes no finding with regard to whether [the species] warrant consideration for ESA listing."

In *Nassiri v. City of Lafayette*, the plaintiff contended that the City of Lafayette had failed to identify a significant impact because the site had value for two BCC species, Oak titmouse and Nuttall's

woodpecker. The court held that a "special concern" designation is not equivalent to being deemed "rare" under CEQA, and that there was nothing in the record to support a claim that the two bird species were likely to be candidates for listing under the ESA/CESA, were rare or unique to the region, or existed in such small numbers throughout all or a significant portion of their ranges that they may become endangered.

The identification of 14 new BCC species does not result in a new significant impact because the new BCC species are either not expected to occur in the Project Area and/or do not meet the definition of a rare species pursuant to CEQA. ECORP conducted species searches through the CNDDB, iPaC, eBird, and iNaturalist for occurrences of the 14 new BCC species. None of the species appear within a standard 12-quad search of the CNDDB (Appendix A). Nine of the species – Western grebe, Clark's grebe, American avocet, Pectoral sandpiper, Lesser yellowlegs, Willet, Franklin's gull, Heermann's gull, and Western gull – are birds found in aquatic habitats, including lakes, ponds, rivers, and associated freshwater wetlands. There are no reported occurrences in eBird or iNaturalist of these species in the Project Area. Nearby occurrences are associated with large open water features such as Lake Natomas, Folsom Lake and the American River, with many cited as migrant or vagrant observations. These species are not expected to occur in the Project Area.

The were also no occurrences reported in the CNDDB 12-quad search area of the remaining new BCC species – Calliope hummingbird, Wrentit, California thrasher, Cassin's finch, and Bullock's oriole. Other databases, including eBird and iNaturalist, contain scattered occurrences within a 5-mile radius. Only Wrentit and Bullock's Oriole have reported observations from within the Folsom Plan Area. The oak woodlands and riparian habitats and in the Project Area represent potentially suitable habitat. However, the potential presence of Wrentit and Bullock's oriole in the Project Area does not indicate a new significant impact.

Bullock's oriole and Wrentit are common residents of California where suitable habitat occurs (Appendix B). They are known to be regionally or locally abundant in California including Sacramento Valley and/or Sierra Nevada foothills. Impacts to these species would not trigger a significant impact under CEQA unless the impact had the potential to result in substantial adverse effects such as population declines or range restrictions of these species. The Project Area comprises a small proportion of the species' total geographic range and distribution. The small amount of impact that would occur to oak woodland and riparian habitats in the Project Area would not have the potential to result in a new significant impact to these species pursuant to CEQA.

Air Quality Compliance

The commenter suggests installation of Level 2 electric vehicle (EV) charging infrastructure and battery storage systems for each residence. However, the commenter provides no substantial evidence demonstrating that these measures would substantially reduce the significant and unavoidable air quality and greenhouse gas impacts identified in the FPASP EIR. Since certification of the FPASP EIR in 2011, California has adopted increasingly stringent Building Code a requirements requiring new residential

development to incorporate EV capable infrastructure. As a result, the Project would already be required to comply with applicable State requirements related to electric vehicle readiness.

While EV charging infrastructure may facilitate future electric vehicle ownership, vehicle purchasing decisions are made by future residents and are outside the control of the Project. Installation of charging infrastructure does not ensure the purchase or operation of electric vehicles and therefore does not provide an assured or quantifiable reduction in operational emissions. The commenter provides no quantitative analysis, emissions calculations, or modeling demonstrating that the proposed measures would substantially reduce operational air pollutants or greenhouse gas emissions.

The commenter also proposes the use of super-compliant architectural coatings containing a maximum volatile organic compound (VOC) content of 10 grams per liter. The Project is already required to comply with applicable California Air Resources Board (CARB) and Sacramento Metropolitan Air Quality Management District architectural coating regulations. The commenter provides no substantial evidence demonstrating that coatings with VOC contents below applicable regulatory standards would substantially reduce the significant and unavoidable operational air quality impacts identified in the FPASP EIR. In addition, no quantitative analysis or emissions calculations are provided demonstrating that the proposed measure would result in a meaningful reduction in regional emissions. Accordingly, the proposed measure does not constitute substantial new information requiring additional environmental review.

The commenter further asserts that future residents could be exposed to indoor formaldehyde concentrations associated with composite wood products used in residential construction. The Project would be required to comply with all applicable State regulations governing formaldehyde emissions from composite wood products, including CARB's Airborne Toxic Control Measure for Composite Wood Products. The commenter has not provided project-specific evidence demonstrating that the Project would result in significant health risks beyond those addressed through existing regulatory programs. Furthermore, the cited cancer risk threshold was developed for evaluation of outdoor exposures and is not intended for evaluation of indoor residential air quality conditions. Therefore, the commenter has not identified substantial new information demonstrating a new significant environmental effect or a substantial increase in the severity of a previously identified impact.

CONCLUSION

Based on the foregoing analysis, the Proposed Project implements and maintains consistency with the FPASP. The City of Folsom, acting as the Lead Agency, has evaluated the Project in accordance with CEQA Guidelines Sections 15182 and 15162.

Because the Project is a residential development undertaken in conformity with a certified Specific Plan, and because the Conformity Analysis demonstrates that none of the triggers for subsequent environmental review under Section 15162 have occurred—specifically, there are no substantial Project changes, changed circumstances, or new information revealing a substantially more severe significant environmental impacts—the Project qualifies for a statutory exemption.

Consequently, the City of Folsom finds that the Proposed Project is fully exempt from further environmental review pursuant to CEQA Guidelines Section 15182 and Government Code Section 65457. The Project remains subject to all applicable binding mitigation measures outlined in the FPASP MMRP and the FPASP Backbone Infrastructure Initial Study/Mitigated Negative Declaration (BB IS/MND).

REFERENCES

California Department of Fish and Wildlife. 2023. *Survey Considerations for California Endangered Species Act (CESA) Candidate Bumble Bee Species*. June 6, 2023.

_____. 2026a. *RareFind Natural Diversity Data Base Program. Version 5*. California Department of Fish and Wildlife. California Natural Diversity Database. https://wildlife.ca.gov/Data/CNDDB/Maps-andData. Accessed February 1, 2023, March 18, 2025, and June 10, 2026.

_____. 2026b. Yellow-billed Cuckoo Range - CWHR B259 [ds940] in *CDFW Open Data Portal*. https://data-cdfw.opendata.arcgis.com/datasets/CDFW::yellow-billed-cuckoo-range-cwhr-b259-ds940/explore?location=38.619094%2C-120.675640%2C9. Accessed June 10, 2026.

_____. 2026c. Western Bumble Bee Range – CDFW [ds3097]. https://www.arcgis.com/apps/mapviewer/index.html?layers=c0b86d57ea4e4c54900409d37d2685e2. Accessed June 10, 2026.

California Natural Diversity Database (CNDDB). 2026. Special Animals List. California Department of Fish and Wildlife. Sacramento, CA. April 2026.

City of Folsom. 2011. *Folsom Plan Area Specific Plan Environmental Impact Report/Environmental Impact Statement*. June.

U.S. Fish and Wildlife Service. 2026. *Yellow-billed Cuckoo (Coccyzus americanus) | Map | U.S. Fish & Wildlife Service | FWS.gov*. https://www.fws.gov/species/yellow-billed-cuckoo-coccyzus-americanus/map. Accessed June 10, 2026.

_____. 2024. *Endangered and Threatened Wildlife and Plants; Threatened Species Status With Section 4(d) Rule for Monarch Butterfly and Designation of Critical Habitat*. 50 Code of Federal Regulations Part 17. December 12, 2024.

_____. 2023. *Species status assessment report for the foothill yellow legged frog (Rana boylii), Version 2.11*. U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California. April 2023.

_____. 2021. Birds of Conservation Concern 2021. United States Department of the Interior, U.S. Fish and Wildlife Service, Migratory Birds. Falls Church, Virginia. http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php. Accessed June 11, 2026.

_____. 2014. *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (Coccyzus americanus); Final Rule* (50 Code of Federal Register Part 17). October 3, 2014.

Xerces Society. 2018. *A Petition to the State of California Fish and Game Commission to List the Crotch Bumble Bee (Bombus crotchii), Franklin's Bumble Bee (Bombus franklini), Suckley Cuckoo Bumble Bee (Bombus suckleyi), and Western Bumble Bee (Bombus occidentalis occidentalis) as Endangered*

under the California Endangered Species Act. Submitted by The Xerces Society for Invertebrate Conservation, Defenders of Wildlife, Center for Food Safety. October 2018.

LIST OF APPENDICES

Appendix A – CNDDB and IPaC Database Queries

Appendix B – Species Accounts

APPENDIX A

CNDDB and IPaC Database Queries

Selected Elements by Element Code

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Buffalo Creek (3812152) OR Folsom (3812162) OR Roseville (3812173) OR Rocklin (3812172) OR Pilot Hill (3812171) OR Clarksville (3812161) OR Folsom SE (3812151) OR Carbondale (3812141) OR Sloughhouse (3812142) OR Elk Grove (3812143) OR Carmichael (3812153) OR Citrus Heights (3812163))

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
AAAAA01181	***Ambystoma californiense pop. 1*** California tiger salamander - central California DPS	Threatened	Threatened	G3T3	S3	WL
AAABF02020	***Spea hammondii*** western spadefoot	Proposed Threatened	None	G2G3	S3S4	SSC
AAABH01022	***Rana draytonii*** California red-legged frog	Threatened	None	G2G3	S2S3	SSC
AAABH01055	***Rana boylii pop. 5*** foothill yellow-legged frog - south Sierra DPS	Endangered	Endangered	G3T2	S2	
ABNFD01020	***Nannopterum auritum*** double-crested cormorant	None	None	G5	S4	WL
ABNGA04010	***Ardea herodias*** great blue heron	None	None	G5	S4	
ABNGA04040	***Ardea alba*** great egret	None	None	G5	S4	
ABNKC01010	***Pandion haliaetus*** osprey	None	None	G5	S4	WL
ABNKC06010	***Elanus leucurus*** white-tailed kite	None	None	G5	S3S4	FP
ABNKC10010	***Haliaeetus leucocephalus*** bald eagle	Delisted	Endangered	G5	S3	FP
ABNKC12040	***Astur cooperii*** Cooper's hawk	None	None	G5	S4	WL
ABNKC19070	***Buteo swainsoni*** Swainson's hawk	None	Threatened	G5	S4	
ABNKC19120	***Buteo regalis*** ferruginous hawk	None	None	G4	S3S4	WL
ABNKC22010	***Aquila chrysaetos*** golden eagle	None	None	G5	S3	FP
ABNKD06030	***Falco columbarius*** merlin	None	None	G5	S3S4	WL
ABNME03041	***Laterallus jamaicensis coturniculus*** California black rail	None	Threatened	G3T1	S2	FP
ABNSB10010	***Athene cunicularia*** burrowing owl	None	Candidate Endangered	G4	S2	SSC
ABPAU01010	***Progne subis*** purple martin	None	None	G5	S3	SSC

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
ABPAU08010	***Riparia riparia*** bank swallow	None	Threatened	G5	S3	
ABPBXA0020	***Ammodramus savannarum*** grasshopper sparrow	None	None	G5	S3	SSC
ABPBXB0020	***Agelaius tricolor*** tricolored blackbird	None	Threatened	G3	S2	SSC
AFCHA0209K	***Oncorhynchus mykiss irideus pop. 11*** steelhead - Central Valley DPS	Threatened	None	G5T2Q	S2	SSC
AMACC02010	***Lasionycteris noctivagans*** silver-haired bat	None	None	G4	S3S4	
AMACC10010	***Antrozous pallidus*** pallid bat	None	None	G4	S3	SSC
AMAFJ01010	***Erethizon dorsatum*** North American porcupine	None	None	G5	S3	
AMAJF04010	***Taxidea taxus*** American badger	None	None	G5	S3	SSC
ARAAD02031	***Actinemys marmorata*** northwestern pond turtle	Proposed Threatened	None	G2	SNR	SSC
ARADB36150	***Thamnophis gigas*** giant gartersnake	Threatened	Threatened	G2	S2	
CTT37D00CA	***Ione Chaparral*** Ione Chaparral	None	None	G1	S1.1	
CTT42110CA	***Valley Needlegrass Grassland*** Valley Needlegrass Grassland	None	None	G3	S3.1	
CTT44110CA	***Northern Hardpan Vernal Pool*** Northern Hardpan Vernal Pool	None	None	G3	S3.1	
CTT44132CA	***Northern Volcanic Mud Flow Vernal Pool*** Northern Volcanic Mud Flow Vernal Pool	None	None	G1	S1.1	
CTT45310CA	***Alkali Meadow*** Alkali Meadow	None	None	G3	S2.1	
CTT45320CA	***Alkali Seep*** Alkali Seep	None	None	G3	S2.1	
CTT61430CA	***Great Valley Valley Oak Riparian Forest*** Great Valley Valley Oak Riparian Forest	None	None	G1	S1.1	
ICBRA03030	***Branchinecta lynchi*** vernal pool fairy shrimp	Threatened	None	G3	S3	
ICBRA03150	***Branchinecta mesovallensis*** midvalley fairy shrimp	None	None	G2	S2S3	
ICBRA06010	***Linderiella occidentalis*** California linderiella	None	None	G2G3	S2S3	
ICBRA10010	***Lepidurus packardi*** vernal pool tadpole shrimp	Endangered	None	G3	S3	

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
ICBRA23010	***Dumontia oregonensis*** hairy water flea	None	None	G1G3	S1	
IICOL48011	***Desmocerus californicus dimorphus*** valley elderberry longhorn beetle	Threatened	None	G3T3	S3	
IICOL5V010	***Hydrochara rickseckeri*** Ricksecker's water scavenger beetle	None	None	G2?	S2?	
IIHYM24252	***Bombus occidentalis*** western bumble bee	None	Candidate Endangered	G3	S1	
IIHYM24260	***Bombus pensylvanicus*** American bumble bee	None	None	G3G4	S2	
IIHYM24480	***Bombus crotchii*** Crotch's bumble bee	None	Candidate Endangered	G2	S2	
IIHYM35030	***Andrena blennospermatis*** Blennosperma vernal pool andrenid bee	None	None	G2	S1	
IIHYM35210	***Andrena subapasta*** An andrenid bee	None	None	G1G2	S1S2	
IIPLE23020	***Cosumnoperla hypocrena*** Cosumnes stripetail	None	None	G2	S2	
ILARA14020	***Banksula californica*** Alabaster Cave harvestman	None	None	GH	SH	
PDAPI0Z0P0	***Eryngium pinnatisectum*** Tuolumne button-celery	None	None	G2	S2	1B.2
PDAST11061	***Balsamorhiza macrolepis*** big-scale balsamroot	None	None	G2	S2	1B.2
PDAST1P090	***Calycadenia spicata*** spicate calycadenia	None	None	G3?	S3	1B.3
PDAST8H1V0	***Packera layneae*** Layne's ragwort	Threatened	Rare	G2	S2	1B.2
PDAST9X0D0	***Wyethia reticulata*** El Dorado County mule ears	None	None	G2	S2	1B.2
PDCAM060C0	***Downingia pusilla*** dwarf downingia	None	None	GU	S2	2B.2
PDCAM0C010	***Legenere limosa*** legenere	None	None	G2	S2	1B.1
PDCIS020F0	***Crocanthemum suffrutescens*** Bisbee Peak rush-rose	None	None	G2?Q	S2?	3.2
PDCON040H0	***Calystegia stebbinsii*** Stebbins' morning-glory	Endangered	Endangered	G1	S1	1B.1
PDERI04240	***Arctostaphylos myrtifolia*** Ione manzanita	Threatened	None	G1	S1	1B.2
PDONA05053	***Clarkia biloba ssp. brandegeeae*** Brandegee's clarkia	None	None	G4G5T4	S4	4.2

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
PDPGN080F1	***Eriogonum apricum var. apricum*** Ione buckwheat	Endangered	Endangered	G2T1	S1	1B.1
PDPGN080F2	***Eriogonum apricum var. prostratum*** Irish Hill buckwheat	Endangered	Endangered	G2T1	S1	1B.1
PDPLM0C0X1	***Navarretia myersii ssp. myersii*** pincushion navarretia	None	None	G2T2	S2	1B.1
PDRHA04190	***Ceanothus roderickii*** Pine Hill ceanothus	Endangered	Rare	G1	S1	1B.1
PDROS0W0C0	***Horkelia parryi*** Parry's horkelia	None	None	G2	S2	1B.2
PDRUB0N0E7	***Galium californicum ssp. sierrae*** El Dorado bedstraw	Endangered	Rare	G5T1	S1	1B.2
PDSCR0J0D1	***Chloropyron molle ssp. hispidum*** hispid salty bird's-beak	None	None	G2T1	S1	1B.1
PDSCR0R060	***Gratiola heterosepala*** Boggs Lake hedge-hyssop	None	Endangered	G2G3	S2	1B.2
PDSTE03030	***Fremontodendron decumbens*** Pine Hill flannelbush	Endangered	Rare	G1	S1	1B.2
PMALI040Q0	***Sagittaria sanfordii*** Sanford's arrowhead	None	None	G3	S3	1B.2
PMCYP03M60	***Carex xerophila*** chaparral sedge	None	None	G2	S2	1B.2
PMJUN011L1	***Juncus leiospermus var. ahartii*** Ahart's dwarf rush	None	None	G2T1	S1	1B.2
PMJUN011L2	***Juncus leiospermus var. leiospermus*** Red Bluff dwarf rush	None	None	G2T2	S2	1B.1
PMLIL0G020	***Chlorogalum grandiflorum*** Red Hills soaproot	None	None	G3	S3	4.2
PMLIL0V010	***Fritillaria agrestis*** stinkbells	None	None	G3	S3	4.2
PMPOA4G050	***Orcuttia tenuis*** slender Orcutt grass	Threatened	Endangered	G2	S2	1B.1
PMPOA4G070	***Orcuttia viscida*** Sacramento Orcutt grass	Endangered	Endangered	G1	S1	1B.1

Record Count: 77

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

El Dorado and Sacramento counties, California

Local office

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Reptiles

NAME	STATUS
Northwestern Pond Turtle Actinemys marmorata Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1111	Proposed Threatened

Amphibians

NAME	STATUS
California red-legged frog Rana draytonii Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/2891	Threatened
Foothill yellow-legged frog Rana boylii There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/5133	Endangered
Western spadefoot Spea hammondii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5425	Proposed Threatened

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Insects

NAME	STATUS
Monarch butterfly Danaus plexippus Wherever found There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/9743	Proposed Threatened
Valley elderberry longhorn beetle Desmocerus californicus dimorphus Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/7850	Threatened

Crustaceans

NAME	STATUS
Conservancy fairy shrimp Branchinecta conservatio Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/8246	Endangered
Vernal pool fairy shrimp Branchinecta lynchi Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/498	Threatened
Vernal pool tadpole shrimp Lepidurus packardi Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/2246	Endangered

Flowering Plants

NAME	STATUS
El Dorado bedstraw Galium californicum ssp. sierrae Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5209	Endangered
Pine Hill ceanothus Ceanothus roderickii Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3293	Endangered
Pine Hill flannelbush Fremontodendron californicum ssp. decumbens Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4818	Endangered
Sacramento Orcutt grass Orcuttia viscida Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/5507	Endangered
Slender Orcutt grass Orcuttia tenuis Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/1063	Threatened
Stebbins' morning-glory Calystegia stebbinsii Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3991	Endangered

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Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

Review the FAQs
The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31

NOT FOR CONSULTATION

Golden Eagle Aquila chrysaetos

Breeds Jan 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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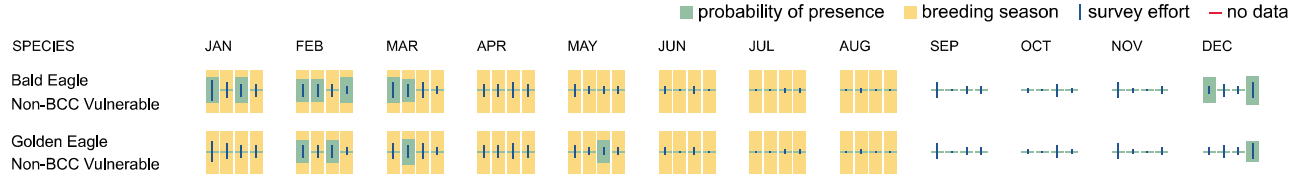

Bald & Golden Eagles FAQs

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle (Bald and Golden Eagle Protection Act requirements may apply).

Proper interpretation and use of your eagle report
On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there,

and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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Migratory birds

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Measures for Proactively Minimizing Migratory Bird Impacts

Your IPaC Migratory Bird list showcases birds of concern, including Birds of Conservation Concern (BCC), in your project location. This is not a comprehensive list of all birds found in your project area. However, you can help proactively minimize significant impacts to all birds at your project location by implementing the measures in the Nationwide avoidance and minimization measures for birds document, and any other project-specific avoidance and minimization measures suggested at the link Measures for avoiding and minimizing impacts to birds for the birds of concern on your list below.

Ensure Your Migratory Bird List is Accurate and Complete

If your project area is in a poorly surveyed area, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles document, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

Review the FAQs

The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31
Belding's Savannah Sparrow Passerculus sandwichensis beldingi This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8	Breeds Apr 1 to Aug 15
Bullock's Oriole Icterus bullockii This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 21 to Jul 25
California Gull Larus californicus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 1 to Jul 31
Cassin's Finch Haemorhous cassinii This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9462	Breeds May 15 to Jul 15
Common Yellowthroat Geothlypis trichas sinuosa This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31
Golden Eagle Aquila chrysaetos This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31
Lawrence's Goldfinch Spinus lawrencei This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9464	Breeds Mar 20 to Sep 20
Marbled Godwit Limosa fedoa This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Northern Harrier Circus hudsonius This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8350	Breeds Apr 1 to Sep 15
Nuttall's Woodpecker Dryobates nuttallii This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9410	Breeds Apr 1 to Jul 20
Oak Titmouse Baeolophus inornatus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9656	Breeds Mar 15 to Jul 15

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Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Santa Barbara Song Sparrow Melospiza melodia graminea — Breeds Mar 1 to Sep 5

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/5513

Tricolored Blackbird Agelaius tricolor — Breeds Mar 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3910

Western Grebe Aechmophorus occidentalis — Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/6743

Yellow-billed Magpie Pica nuttalli — Breeds Apr 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9726

NOT FOR CONSULTATION

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (▪)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

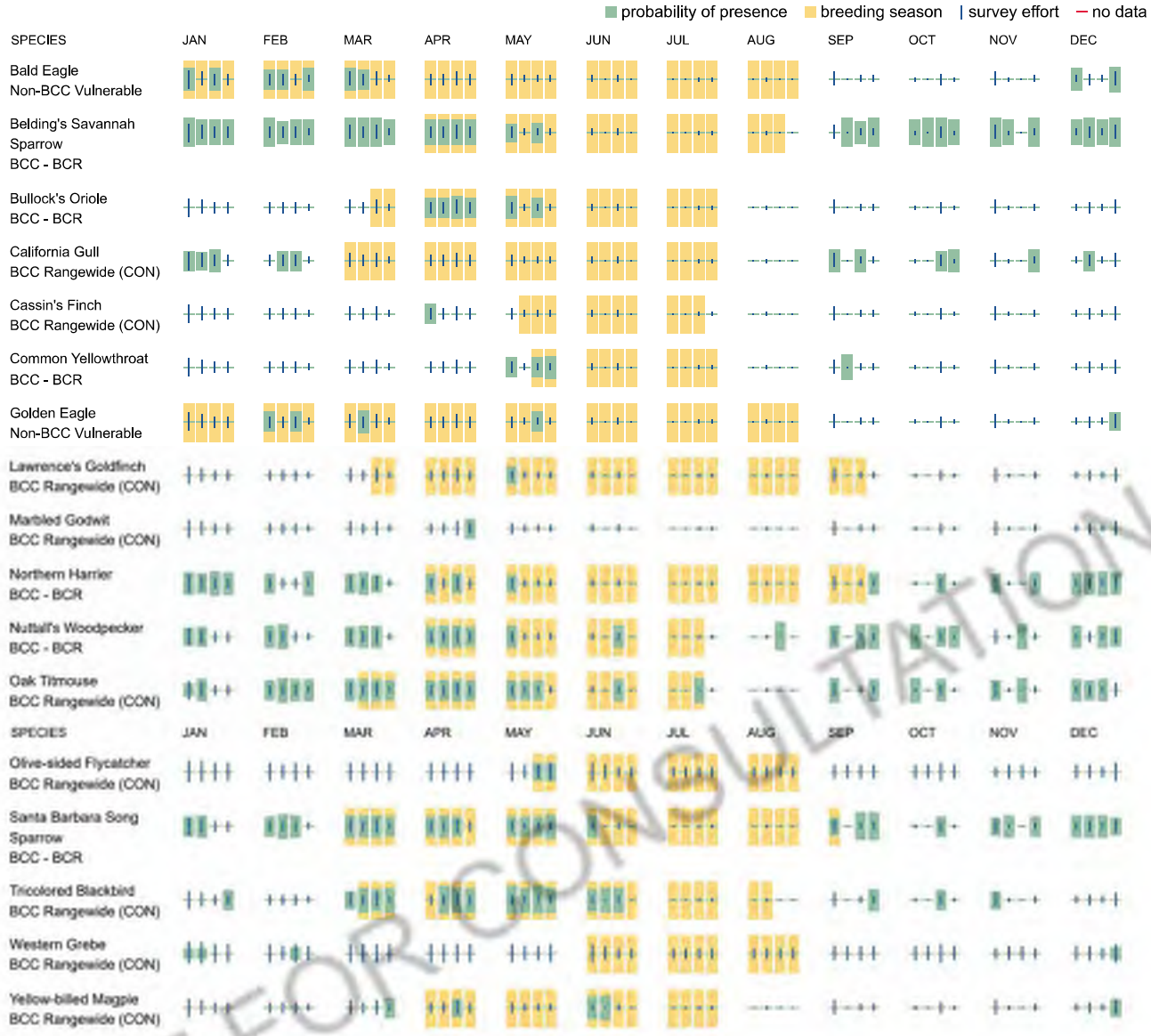
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



NOT FOR CONSULTATION

Migratory Bird FAQs

Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Avoidance & Minimization Measures for Birds describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the Bald and Golden Eagle Protection Act and those species marked as "Vulnerable". See the FAQ "What are the levels of concern for migratory birds?" for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle (Bald and Golden Eagle Protection Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the Rapid Avian Information Locator (RAIL) Tool.

Why are subspecies showing up on my list?

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for **the species** are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Bald and Golden Eagle Protection Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ "Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Proper interpretation and use of your migratory bird report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:

The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND
- PEM1A
- PEM1C
- PEM1Fh
- PEM1Ch

FRESHWATER FORESTED/SHRUB WETLAND
- PFOA
- PFOCh

FRESHWATER POND
- PUBHh
- PUBFh
- PUBFx

RIVERINE
- R4SBC
- R5UBFx
- R4SBCx
- R5UBF

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

NOT FOR CONSULTATION

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

APPENDIX B

Species Accounts

Audubon

Calliope Hummingbird

Adult male. Photo: Syler Peralta Ramos/Audubon Photography Awards

Calliope Hummingbird

Selasphorus calliope

At a Glance

The Calliope Hummingbird is the smallest bird in North America, measuring about 3 inches long and weighing about one-tenth of an ounce. Despite its tiny size, it is able to survive cold summer nights at high elevations in the northern Rockies, and some migrate every year from Canada all the way to southern Mexico. In migration it may be overlooked, often feeding at low flowers and avoiding the aggression of larger hummingbirds.

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CATEGORY Hummingbirds	IUCN STATUS Least Concern
HABITAT Desert and Arid Habitats, Forests and Woodlands, High Mountains, Shrublands, Savannas, and Thickets	REGION California, Northwest, Rocky Mountains, Southeast, Southwest, Texas, Western Canada
BEHAVIOR Flitter, Hovering, Rapid Wingbeats	POPULATION 4,500,000

Range & Identification

Migration & Range Maps

Moves northwest in early spring, mostly through Pacific lowlands, and moves southeast in very early fall (beginning in July) mostly through Rocky Mountain region. Adult males migrate slightly earlier than females or young at both seasons.

All Seasons - Common
All Seasons - Uncommon
Breeding - Common
Breeding - Uncommon
Winter - Common
Winter - Uncommon
Migration - Common
Migration - Uncommon

Description

Sexes similar; female slightly larger — Length: 3.1 - 3.5 in (8 - 9 cm); wingspan: 4.3 - 4.7 in (11 - 12 cm); weight: 0.1 oz (2 - 3 g). The Calliope Hummingbird is North America's smallest hummingbird. Adult male has smeary magenta stripes on throat, pale green on sides. Female and young smaller than female Rufous Hummingbird, with shorter bill; short, rounded tail, with very little rusty at base; often shows a pale buff wash clear across chest.

:E About the size of a Sparrow

LOR	Green, Orange, Purple, Red
NG SHAPE	Narrow, Rounded, Short
IL SHAPE	Notched, Rounded, Square-tipped

Songs and Calls

A high-pitched tsew.

LL PATTERN	Flat
LL TYPE	Buzz, Chirp/Chip

Habitat

Forest glades, canyons, usually in mountains. Calliope Hummingbird breeds mostly from 4,000 feet up to near treeline. Favors open shrubby areas, especially near streams, and may be most common in second growth several years after fire or logging. Winters mostly in pine-oak woods of mountains in Mexico, and migrants occur both in mountains and lowlands.

Behavior

Eggs

A Calliope Hummingbird lays two eggs. Eggs are white. Incubation is by female only, 15-16 days.

Young

Female feeds the young, and broods them to keep them warm between feeding bouts and at night. Age of young at first flight about 18-21 days.

Feeding Behavior

Often visits flowers growing within inches of the ground. At flowers, usually feeds while hovering, extending its bill deep into the center of the flower. At feeders, may either hover or perch. To catch small insects, may fly out and capture them in midair, or hover to pluck them from foliage.

Diet

The Calliope Hummingbird feeds mostly on nectar and insects. Takes nectar from flowers, and will feed on tiny insects as well. Will also feed on sugar-water mixtures in hummingbird feeders.

Nesting

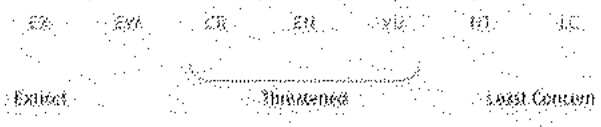
Male establishes breeding territory and drives other males away. Male performs a U-shaped courtship flight display, rising 30-100 ft and diving steeply, with popping and zinging sound at bottom of dive, then rising again. Male also hovers before female with throat feathers flared out. Nest site is usually in a pine or other conifer, sometimes in deciduous shrub. Usually 6-40 ft up, can be much higher. Sometimes built on base of old pine cone. Nest (built by female) is a compact cup of plant down, moss, bark fibers, spider webs, with the outside camouflaged with bits of lichen.

Conservation

Conservation Status

Calliope Hummingbird is fairly common in its range, but vulnerable to effects of habitat loss.

IUCN Red List Status: Least Concern



Climate Map

Audubon's scientists have used 140 million bird observations and sophisticated climate models to project how climate change will affect the range of the Calliope Hummingbird. Learn even more in **Audubon's Survival By Degrees project**.

Audubon

Wrentit

Adult. Photo: Becky Matsubara/Flickr (CC-BY-2.0)

Wrentit

Chamaea fasciata

At a Glance

In the chaparral, the dense low brush that grows along the Pacific seaboard, Wrentits are often heard and seldom seen. Pairs of these long-tailed little birds move about actively in the depths of the thickets, rarely perching in the open or flying across small clearings. They are remarkably sedentary; a bird may spend its entire adult life in an area of just a couple of acres.

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CATEGORY Perching Birds, Wrentits	IUCN STATUS Least Concern
HABITAT Forests and Woodlands, Shrublands, Savannas, and Thickets	REGION California, Northwest
BEHAVIOR Flitter	POPULATION 2,200,000

Range & Identification

Migration & Range Maps

Permanent resident and very sedentary, seldom wandering away from breeding areas; rarely a few may wander to higher elevations in late summer.

All Seasons - Common
All Seasons - Uncommon
Breeding - Common
Breeding - Uncommon
Winter - Common
Winter - Uncommon
Migration - Common
Migration - Uncommon

Description

6-6 1/2" (15-17 cm). Long tail, stubby bill. Overall gray-brown to reddish brown, with staring pale eye, blurry stripes on chest. Very elusive, hard to see.

'E	About the size of a Robin, About the size of a Sparrow
LOR	Brown, Gray
IL SHAPE	Long, Rounded

Songs and Calls

An accelerating series of musical notes running together into a trill and dropping slightly in pitch toward the end; peep peep peep-pee-pee-peepeepepepprrrr. Call is a prolonged dry "growling" note. This species is far more often heard than seen.

LL PATTERN	Flat
LL TYPE	Chirp/Chip, Trill

Habitat

Chaparral, brush, parks, garden shrubs. Within its range, the Wrentit inhabits most kinds of dense low growth. Most common in chaparral, thickets of poison oak, and coastal sage scrub; also lives in streamside thickets and in shrubby areas in suburbs and city parks. Extends very locally to edge of desert.

Behavior

Eggs

4, sometimes 3-5. Pale greenish blue, unmarked. Incubation is by both parents, about 16 days. Female reportedly incubates at night, both sexes taking turns during the day.

Young

Both parents feed nestlings. Young leave the nest about 15-16 days after hatching, are tended by parents for another 2-3 weeks.

Feeding Behavior

Forages actively in dense low growth, gleaning insects from twigs, sometimes hanging upside down to examine foliage. Sometimes hovers briefly while taking an item. Will hold a large insect with one foot while breaking off the wings.

Diet

Mostly insects and berries. Feeds heavily on insects, especially in spring and summer, including ants, small wasps, caterpillars, beetles, scale insects, leafhoppers, and others, plus spiders. Eats many berries, especially in fall and winter, including those of poison oak. Will come to bird feeders for bread crumbs or other soft items, and takes sugar-water from hummingbird feeders.

Nesting

May mate for life. Pairs remain together on nesting territory at all seasons. Nest: Well hidden by foliage in a dense low shrub, usually 1-4' above the ground, rarely above 10' in small tree. Firmly lashed into place, attached to clusters of twigs or built in fork of branch. Nest (built by both sexes) is a neatly constructed, compact cup, typically made of strips of bark and spiderwebs, lined with fine plant fibers and sometimes animal hair. Outside of nest may be decorated with bits of lichen.

Conservation

Conservation Status

Has declined in some areas with increasing development of coastal regions. Still fairly widespread and common.

IUCN Red List Status: Least Concern

Change in Abundance Over Time

Drawing on more than a century of community science from the Christmas Bird Count (CBC), this chart shows how this species' relative abundance has shifted in recent decades. **Explore more and get involved in the CBC**.

Climate Map

Audubon's scientists have used 140 million bird observations and sophisticated climate models to project how climate change will affect the range of the Wrentit. Learn even more in **Audubon's Survival By Degrees project**.

Audubon

California Thrasher

Adult. Photo: Chris Miller/Audubon Photography Awards

California Thrasher

Toxostoma redivivum

At a Glance

Several kinds of dull gray-brown thrashers occur in the West, but this is the only one along the California coast. The normal range of a California Thrasher is limited to California and a corner of Baja, but within that range it is quite common in the chaparral, even coming into brushy suburbs. It spends most of its time on the ground, walking and running with its tail often held high, stopping to dig in the dirt with its sickle-shaped bill.

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CATEGORY Mockingbirds and Thrashers, Perching Birds	IUCN STATUS Least Concern
HABITAT Fields, Meadows, and Grasslands, Forests and Woodlands, Shrublands, Savannas, and Thickets, Urban and Suburban Habitats	REGION California, Northwest
BEHAVIOR Flitter, Running	POPULATION 240,000

Range & Identification

Migration & Range Maps

Strictly permanent resident, rarely wandering even a short distance from breeding areas.

All Seasons - Common	Winter - Common
All Seasons - Uncommon	Winter - Uncommon
Breeding - Common	Migration - Common
Breeding - Uncommon	Migration - Uncommon

Description

Sexes similar — Length: 11-12 in (28-30 cm); wingspan: 13-15 in (33-38 cm); weight: 2.5-3.5 oz (70-100 g). The California Thrasher has a strongly curved bill, plain dark brown overall, with pale eyebrow, dark eyes, buff wash on belly.

'E	About the size of a Crow, About the size of a Robin
LOR	Black, Brown, Gray, Red, Tan, White
NG SHAPE	Broad
IL SHAPE	Long, Rounded, Wedge-shaped

Songs and Calls

Song recalls that of a Northern Mockingbird, but harsher, more halting, and less repetitious. An expert mimic. Call a low harsh chuck and a throaty quip.

LL PATTERN	Falling, Rising, Undulating
LL TYPE	Chirp/Chip, Trill, Whistle

Habitat

Chaparral, foothills, valley thickets, parks, gardens. Within its range, found in practically any lowland habitat with dense low brush. Most common in chaparral, also occurs in streamside thickets and in suburban neighborhoods that have enough vegetation. Extends into edges of desert regions, and in chaparral in mountains up to about 6,000 ft.

Behavior

Eggs

A California Thrasher generally lays 3-4 eggs, sometimes 2. The eggs are pale blue, evenly spotted with pale brown. Incubation is by both parents, about 14 days.

Young

Both parents feed nestlings. Young leave the nest after about 12-14 days, are unable to fly well for several more days. Male may care for young from first brood while female begins laying second clutch. Two broods per year, perhaps sometimes three.

Feeding Behavior

Forages mostly on the ground, using its heavy curved bill to flip leaf-litter aside and to dig in the soil.

Diet

The California Thrasher feeds on a wide variety of insects, including ants, wasps, bees, beetles, caterpillars, moths, and many others. Also eats some spiders and centipedes. Berries and small fruits are important in diet, and eats seeds, acorns, and other plant material. Will come to bird feeders for miscellaneous scraps.

Nesting

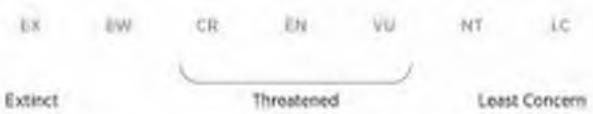
Pairs may remain together on territory all year. Male sings to defend nesting territory, usually from top of shrub or tree; song often includes imitations of other birds. Nest: Placed in a dense shrub or extensive thickets, less than 10 ft above the ground, usually 2-4 ft up. Nest (built by both sexes) is a bulky open cup of sticks and twigs, lined with fine grass, weeds, rootlets, strips of bark, and other soft items.

Conservation

Conservation Status

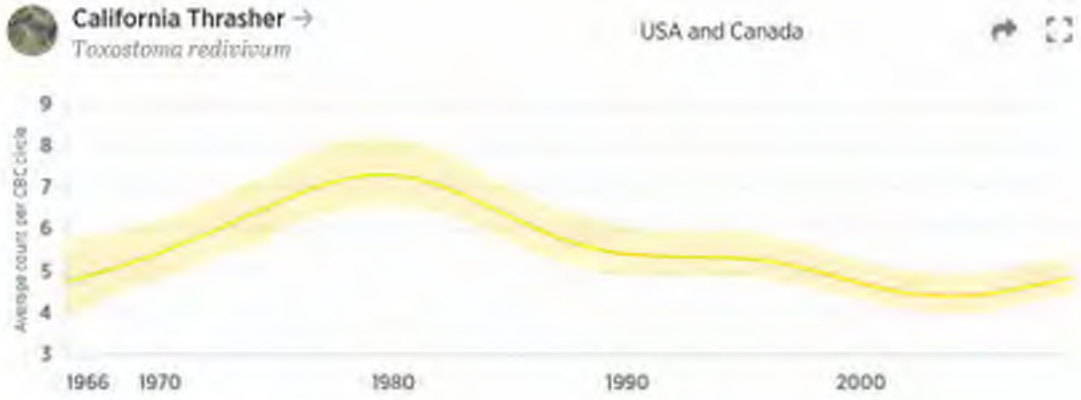
The California Thrasher has disappeared in many coastal areas with increasing urbanization, but still fairly widespread and common.

IUCN Red List Status: Least Concern



Change in Abundance Over Time

Drawing on more than a century of community science from the Christmas Bird Count (CBC), this chart shows how this species' relative abundance has shifted in recent decades. **Explore more and get involved in the CBC**.



Climate Map

Audubon's scientists have used 140 million bird observations and sophisticated climate models to project how climate change will affect the range of the California Thrasher. Learn even more in **Audubon's Survival By Degrees project**.

Audubon

Cassin's Finch

Adult male. Photo: Patty McGann/Flickr (CC BY-NC 2.0)

Cassin's Finch

Haemorhous cassinii

At a Glance

Like a slightly larger, longer-billed version of the Purple Finch, the Cassin's Finch is a resident of mountains and conifer forests of the West. It is sometimes found at very high elevations, in the scrubby forest just below treeline, especially in late summer. At other times, little roving flocks wander through the woods, often feeding on buds and seeds high in the trees. The complicated song of the male often includes brief imitations of other birds.

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CATEGORY
Finches, Perching Birds

IUCN STATUS
Near Threatened

HABITAT
Arroyos and Canyons, Forests and Woodlands, High Mountains

REGION
California, Northwest, Plains, Rocky Mountains, Southwest, Texas, Western Canada

BEHAVIOR
Flitter, Rapid Wingbeats, Undulating

POPULATION
3,200,000

Range & Identification

Migration & Range Maps

Somewhat nomadic, with numbers present in a given locality often changing from year to year. Irregular in winter occurrence in lowlands, but sometimes wanders well out onto plains.

Description

Sexes similar — Length: 5.9 - 6.7 in (15 - 17 cm); wingspan: 10.2 - 10.6 in (26 - 27 cm); weight: 0.8 - 1.2 oz (24 - 34 g). The Cassin's Finch is very similar to a Purple Finch (which is absent from many areas of the west). Cassin's Finch is slightly larger, with slightly longer bill. Note dark streaks on white undertail coverts. Male has sharply defined red cap, paler pink chest. Female has plainer face, sharper streaks below than female Purple Finch; often shows pale eye-ring. Compare also to House Finch which is usually at lower elevations.

:E	About the size of a Robin. About the size of a Sparrow
LOR	Brown, Red, White
NG SHAPE	Pointed
IL SHAPE	Notched

Songs and Calls

Song is a series of warbles, similar to the Purple Finch's but flutier and more varied. Call note, a high pwee-de-lip, is diagnostic.

LL PATTERN	Complex, Falling, Rising, Undulating
LL TYPE	Chatter, Chirp/Chip, High, Trill, Whistle

Habitat

Conifers in high mountains; lower levels in winter. Breeds mostly in mountain forests of conifers, especially spruce and fir, also in pine and Douglas-fir in some areas and sometimes in pinyon-juniper woods. Often at very high elevations, near treeline in mountains. Winters in mountain forests of conifers, sometimes in open woods of lower valleys.

Behavior

Eggs

A Cassin's Finch generally lays 4-5 eggs, sometimes 3-6. The eggs are bluish green, with brown and black spots often concentrated at larger end. Incubation is by female only, about 12-14 days. Male often feeds female during incubation.

Young

Both parents feed nestlings. Young leave nest about two weeks after hatching, and parents and young may promptly leave nesting area.

Feeding Behavior

Does much foraging up in trees, especially when ground is snow-covered; also feeds in weedy growth and on ground. Except when nesting, often forages in small flocks.

Diet

The Cassin's Finch feeds mainly on vegetable material. Buds of various trees often staple items in diet, also eats seeds of many trees (especially conifers) and some weed seeds. Feeds on berries and small fruits when available. Also eats some insects, perhaps mainly in summer.

Nesting

Numbers breeding in an area often change from one year to the next, possibly in response to food supplies. The Cassin's Finch may nest in small colonies. Male often does not defend much of a nesting territory, instead simply staying close to female and driving away rival males. Nest: Usually placed in large conifer, commonly about 30-40 ft above ground, may be as low as 10 ft or as high as 80 ft up; sometimes in aspen or other deciduous tree. Nest (probably built by female) is open cup made of twigs, weeds, rootlets, strips of bark, lined with fine grass, plant fibers, animal hair, sometimes decorated with lichens.

Conservation

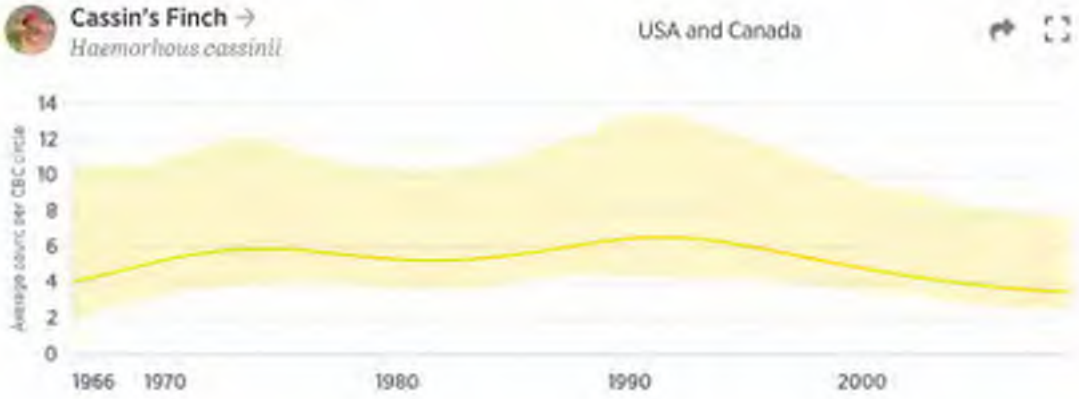
Conservation Status

The Cassin's Finch is common and widespread, but surveys suggest declining populations in recent decades.

IUCN Red List Status: Near Threatened

Change in Abundance Over Time

Drawing on more than a century of community science from the Christmas Bird Count (CBC), this chart shows how this species' relative abundance has shifted in recent decades. **Explore more and get involved in the CBC**.



Climate Map

Audubon's scientists have used 140 million bird observations and sophisticated climate models to project how climate change will affect the range of the Cassin's Finch. Learn even more in **Audubon's Survival By Degrees project**.

Audubon

Bullock's Oriole

Adult male. Photo: Rick Derevan/Audubon Photography Awards

Bullock's Oriole

Icterus bullockii

At a Glance

In the west, the Bullock's Oriole is common in summer in forest edge, farmyards, leafy suburbs, isolated groves, and streamside woods, especially in cottonwood trees. For several years it was considered to belong to the same species as the eastern Baltimore Oriole (with the two combined under the name Northern Oriole), because the two often interbreed where their ranges come in contact on the western Great Plains. The habits of the two are similar.

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CATEGORY
Blackbirds and Orioles, Perching Birds

IUCN STATUS
Least Concern

HABITAT
Forests and Woodlands, Shrublands, Savannas, and Thickets, Urban and Suburban Habitats

REGION
California, Florida, Northwest, Plains, Rocky Mountains, Southwest, Texas

BEHAVIOR
Direct Flight

POPULATION
7,400,000

Range & Identification

Migration & Range Maps

Migrates in small flocks. Fall migration begins early, with many birds leaving northern breeding areas by the end of July.

All Seasons - Common
All Seasons - Uncommon
Breeding - Common
Breeding - Uncommon
Winter - Common
Winter - Uncommon
Migration - Common
Migration - Uncommon

Description

Sexes similar — Length: 6.7 - 7.5 in (17 - 19 cm); wingspan: 11.8 - 13.4 in (30 - 34 cm); weight: 1.1 - 1.5 oz (32 - 43 g). The male Bullock's Oriole resembles male a Baltimore Oriole but has an orange face, more white in wing, and a different tail pattern. Female is usually not as orange as a female Baltimore Oriole, with grayer back, whiter belly, darker eyeline, but some are not safely identified.

'E	About the size of a Robin, About the size of a Sparrow
LOR	Black, Brown, Orange, White
NG SHAPE	Rounded

TL SHAPE	Rounded, Square-tipped

Songs and Calls

Clear and flute-like whistled single or double notes in short, distinct phrases with much individual variation. Also a rapid chatter.

LL PATTERN	Falling
LL TYPE	Chatter, Chirp/Chip, Whistle

Habitat

Open woods, riverside groves. Breeds in deciduous trees in fairly open habitats, such as forest edge, isolated groves and streamside woods, especially in cottonwood trees. Readily adapts to some suburban neighborhoods if enough trees are present. Winters mostly in the tropics around forest edge and semi-open country.

Behavior

Eggs

The Bullock's Oriole typically lays 4-5 eggs, sometimes 3-7. The eggs are bluish white to pale gray, with brown and black markings concentrated at larger end. Incubation is by female, about 11 days.

Young

Both parents feed the nestlings. Young leave nest about 14 days after hatching.

Feeding Behavior

Forages by searching for insects among foliage of trees and shrubs, rarely on the ground. Sometimes flies out to catch insects in midair. Visits flowers for nectar, and will come to sugar-water feeders; also attracted to pieces of fruit put out at feeders.

Diet

In summer, the Bullock's Oriole feeds mostly on insects, especially caterpillars; also eats beetles, grasshoppers, crickets, wasps, bugs, and others, plus spiders. Eats many berries and wild fruits, sometimes cultivated fruit. Feeds on nectar and will take sugar-water.

Nesting

Male sings to defend nesting territory. In courtship, the male Bullock's Oriole faces female and stretches upright, with tail spread and wings quivering and partly open. Nest site is in tall deciduous tree, suspended from the tips of slender drooping branches, usually 10-25 ft above the ground, can be up to 50 ft high. Nest (built by female, sometimes with help from male) is a hanging pouch, with its rim firmly attached to a branch; tends to be wider and deeper than the nest of Baltimore Oriole. Nest is tightly woven of plant fibers, strips of bark, vine tendrils, grass, yarn, and string, lined with fine grass, plant down, hair.

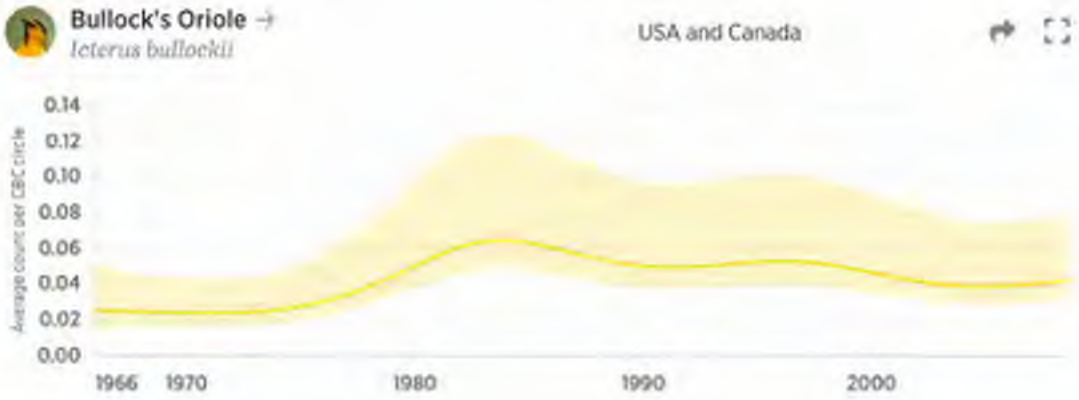
Conservation

Conservation Status

Bullock's Oriole is still widespread and common, with only slight declines noted in recent decades.

Change in Abundance Over Time

Drawing on more than a century of community science from the Christmas Bird Count (CBC), this chart shows how this species' relative abundance has shifted in recent decades. **Explore more and get involved in the CBC**.



Climate Map

Audubon's scientists have used 140 million bird observations and sophisticated climate models to project how climate change will affect the range of the Bullock's Oriole. Learn even more in **Audubon's Survival By Degrees project**.